Scientific American.

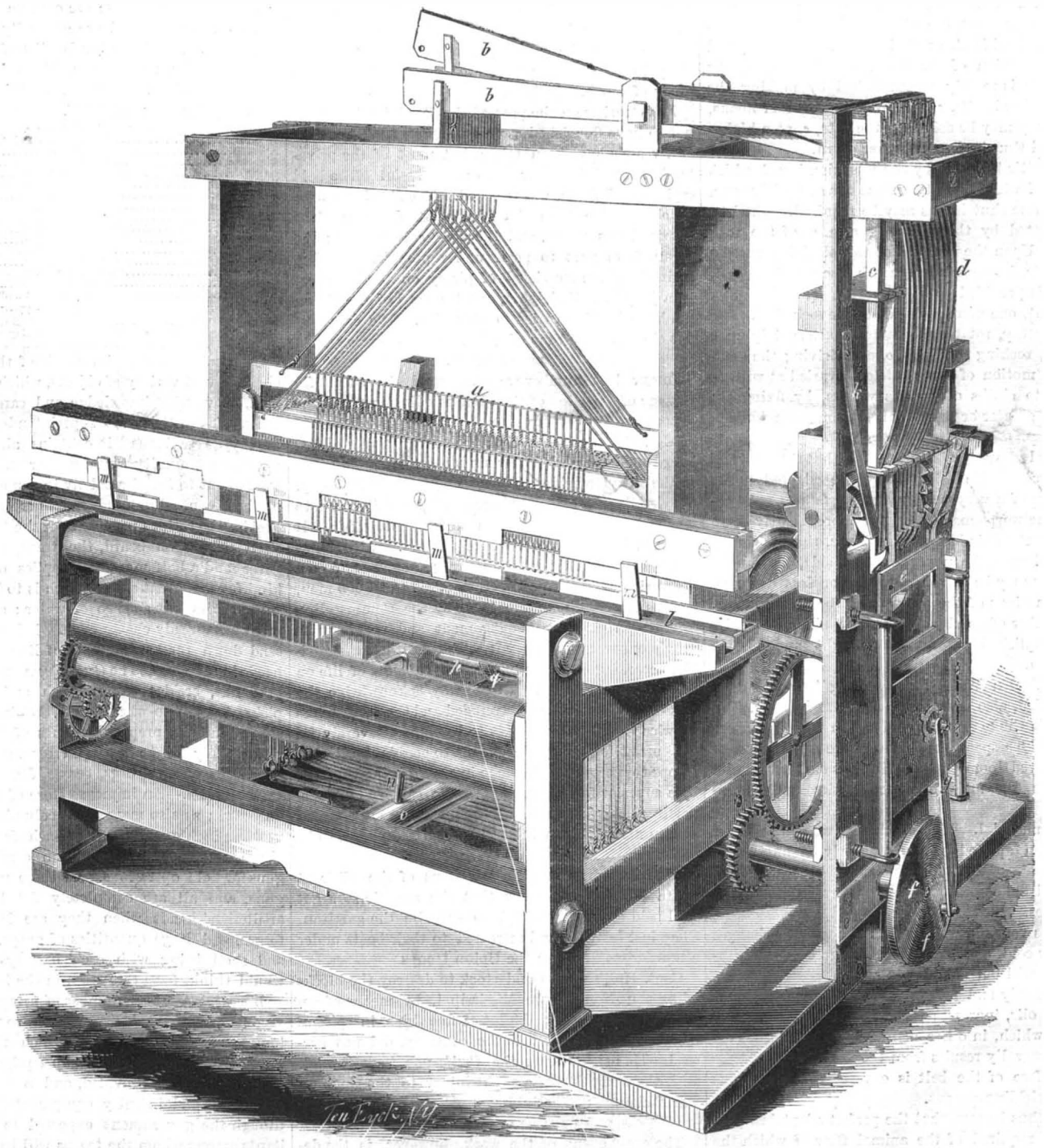
A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

VOL. V.---NO. 19. NEW YORK, NOVEMBER 9, 1861. NEW SERIES

Woolen Belting and its Manufacture.

The loom illustrated by the accompanying engravings is one of those thaumaturgic machines that have the power of accomplishing very various, and apparently impossible results. It will weave two seamless sacks, one within the other, at the same time, or one, two or three round, solid cords, or fancy cassimere, or plain shirting or sheeting of any width, from a few inches to twelve feet, or wide or narrow sails, or almost any other kind of textile fabric that has ever been seen, or that can be imagined. The principal purpose, however, for which it is used, is the manufacture of woolen belting, an article patented by the inventor of the loom, Joseph H. Clifton, of New Castle, Pa., who believes that wool belting manufactured in his loom will inevitably supersede all other kinds of belting which have been hitherto introduced.

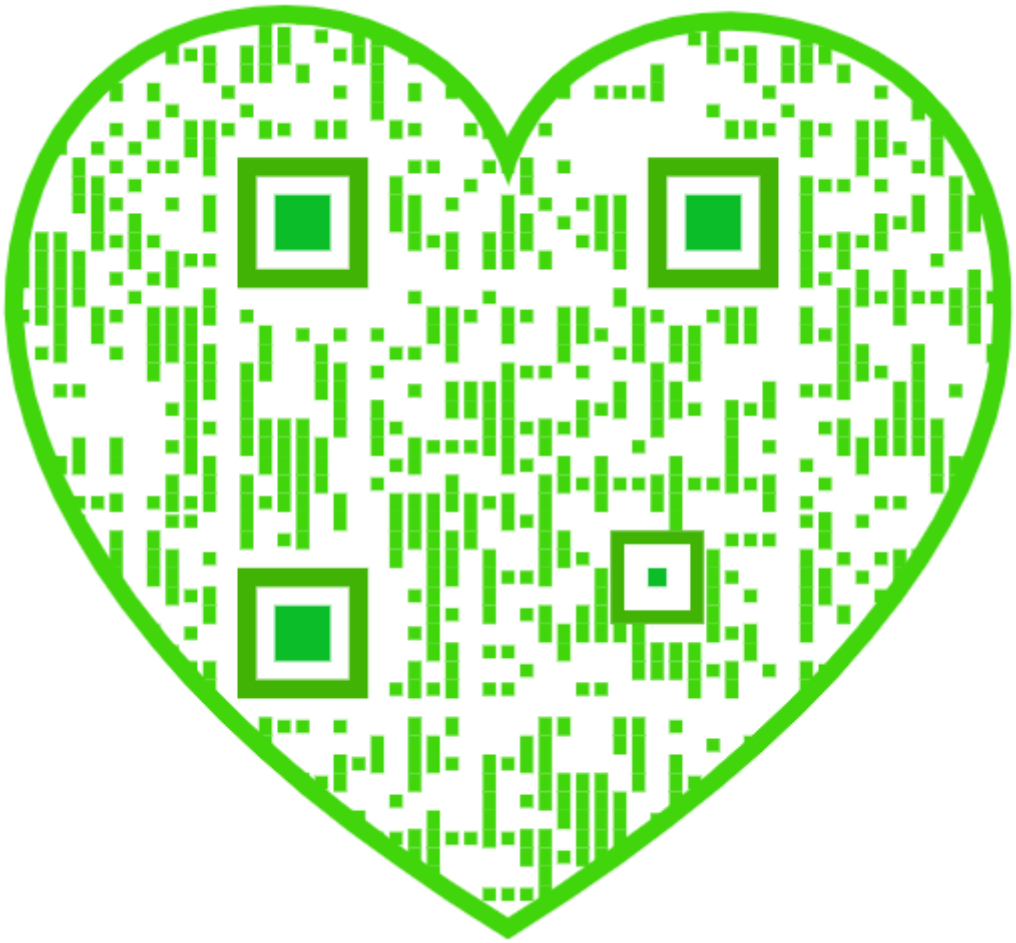
Though the loom is capable of producing such a variety of results, it is by no means complicated in its structure, and will be easily understood from an examination of the engraving. The harnesses, *a*, through which the warps are drawn, may be of any number desired, from two upward, and they are actuated by the levers or jacks, *b b*, a lever to each harness.



CLIFTON'S LOOM FOR WEAVING BELTING AND OTHER ARTICLES.

Pendent from the outer ends of the jacks, *b*, are the vertical hooks, *c*, which are pressed back by the springs, *d*, just out of the way of the gate, *e*, that receives a constant reciprocating vertical motion, from its connection with the wheel, *f*, by the rod, *g*.

© 1861 SCIENTIFIC AMERICAN, INC.



Behind the hooks, *c*, is placed a horizontal shaft, with the ratchet wheels, *h* and *i*, upon its ends, and with pins radiating from its axis of sufficient length to press the hooks, *c*, outward, within reach of the gate, *e*, so that they may be caught by the gate in its descent. These pins may be inserted or removed at pleasure, and thus any one or more of the hooks may be drawn down at any point, in the rotation of the shaft, lifting, of course, the corresponding harness or harnesses. Thus, by simply arranging these pins, the operation of the harnesses, and, consequently, the structure of the fabric may be regulated at pleasure. The shaft is rotated by the hook, *j*, catching into the ratchet wheel, *i*, this hook receiving its motion from the gate, *e*. The hook, *k*, holds the shaft from turning backward.

The wheel, *f*, is provided with several holes, at different distances from the center, for inserting the crank pin that carries the rod, *g*, for the purpose of regulating the distance to which the harnesses are lifted, according to the fabric that is being woven.

The levers, *b b*, are provided with several holes in their outer ends for connecting the hooks, *c*, and the frame that supports these hooks may be secured at a greater or less distance from the loom frame; by which arrangement the distance to which the harnesses are lifted is also varied at will. If it is desired to raise a portion of the harnesses higher than the others, this is readily accomplished by making the corresponding hooks, *c*, shorter than the other hooks, so that they may be seized by the gate, *e*, at a higher point, and thus be drawn farther down.

The shuttle is driven by the vibrating bar, *l*, which is provided with upright arms, *m m m m*, to drive one, two, or more shuttles, as may be required. The bar, *l*, is operated by the vibrating arm, *n*, of the rock shaft, *o*. Upon the rear end of this shaft is secured a broad plate, immediately beneath the rotating shaft, *p*, which is provided with two cams, (*q*, and another not shown), one upon each side of the rock shaft; and as the shaft, *p*, rotates the cams act alternately upon the plate, rocking the shaft, *o*, and driving the shuttle. The motion of the shuttle is varied at will, to adjust it to cloths of various widths, by fixing the cams at a greater or less distance from the middle of the shaft, *p*.

Practical weavers will understand that these several adjustments enable this loom to be adapted to the production of a very great variety of fabrics. A portion of the warps may be drawn more tightly than others to act as binders to the fabric, the woof may be covered upon the upper or lower side, the shuttle or shuttles may be driven a greater or less distance, and the motions of the warps may be arranged in a great number of combinations; and all these results are accomplished by means of light and simple mechanism.

The "Woolen Water-Proof Belting" to which we have alluded, also invented and patented by Mr. Clifton, and in the manufacture of which it is his intention to make a special and immediate application of the improved loom just described, is claimed by him to possess the following peculiarities and advantages:—

1. The material, which is chiefly wool, has never before been applied in any regularly manufactured belting, but, of necessity, has long been used in a thread-twisted form, by manufacturers, in the driving of spindles.

2. In its very nature it resists atmospheric changes of heat or cold, and will stand a degree of temperature that will burn leather to a crisp.

3. The ready and natural assimilation of the wool to animal oils, increases the protection from decomposition, which, in other manufactured materials for belting generally results from the use of oil.

The surface of the belt is covered with a resinous sizing or yielding cement.

It will thus be seen that the perfect adaptability to the work required of the animal fiber of which the belt is composed, together with the complete mechanical construction which it receives from the improved loom by which it is woven, are elements designed to render this belt for strength, durability and cheapness vastly superior to leather; and, inasmuch as the inherent defects which belong to the leather do not attach to the woolen belt, and, also, in view of the fact that the woolen can be made at from one-third to one-half less cost than the leather belt is made, Mr. Clifton is firmly convinced that his belt will eventually take the place of leather.

Patents on the loom and belting for England, France and Belgium having been secured, the owners are anxious for the effective development of the manufacture and sale of both the loom and belting in these countries, and, to this end, are willing to place them at the disposal of competent parties, on reasonable terms.

Communications may be addressed to Joseph H. Clifton or George Cheesman Morgan, at New Castle, Pa., and to Daniel Euwer, of Pittsburgh, Pa.

NOTES ON MILITARY AND NAVAL AFFAIRS.

THE SITUATION.

The situation of affairs is substantially the same as last week at this time. Gen. Fremont's mounted guard has made a brilliant dash into Springfield, Mo., routed 2,200 Confederates, and hoisted the national ensign over that town. General Kelly has made an advance upon the enemy at Romney, Western Virginia, completely routing and capturing several prisoners, camp equipage and four pieces of artillery. Several skirmishes have also occurred during the week in other places, but they are not of much account as bearing upon the general result. The great battles are yet to be fought which are to determine the stability of our institutions.

Privateering on the part of the Confederates seems not to have flourished very extensively. True, several vessels have been taken, but most of the privateering expeditions have been unsuccessful. The bold cruiser, *Jeff. Davis*, was wrecked. The *Petrel* was sunk by a broadside from the frigate *St. Lawrence*. The *Savannah* was taken, and the *Sumter* is scouring the ocean, from port to port, under pursuit. William Smith has been convicted of piracy on the high seas by a jury in Philadelphia, and the crew of the *Savannah* have just been tried in this city. The case was not closed at the time of going to press.

ENGAGEMENTS.

In our last number we announced the successful passage of a portion of Gen. Banks's divison across the Potomac. In consequence of the disastrous attempt of Col. Baker to push back the enemy toward Leesburg, our forces withdrew under cover of the night to the Maryland side. The action at Edward's Ferry, the details of which have occupied the daily press to a considerable extent, was an unfortunate affair. It was not, in the strict sense of the term a battle, as but 1,800 Union troops were engaged against an enemy variously estimated at from 5,000 to 10,000 men, besides it was not contemplated by the Commanding Gen. to bring on an engagement and no adequate provisions were made for it. The fighting was terrible, according to all accounts, and the loss of life on both sides very great. The enemy acknowledge the loss of 300 in killed and wounded and the Union loss is twice that. Somebody is to be blamed severely for not providing adequate means to enable the Union troops to recross the Potomac in case of being attacked by a superior force. A single scow, capable of transporting some fifty men at a time, was the only means at command. Shameful as this seems it appears to be too true.

Official reports from Fort Pickens of the affair at Santa Rosa clearly show that the secessionists got well paid for their attempt to surprise the garrison. They lost heavily, and retreated to their boats under a murderous fire from the Union troops.

Capt. Hollins, who undertook to destroy the blockading squadron in the Mississippi, by means of an iron-plated tugboat and a lot of fine ships, in spite of his gasconading report to the contrary, did not succeed. He neither sunk the *Preble* nor took it, and, with the exception of a slight injury to the sloop-of-war *Richmond*, no special harm was done.

THE GREAT NAVAL EXPEDITION.

The great event of the week, however, is the departure from Fortress Monroe of the powerful armada, to operate on the southern coast. We gather the following details from the daily press, which, we doubt not, will afford much interest to our readers. The expedition is the combined work of the War and Navy Departments, and was intended to have been ready six weeks ago. It was, however, an immense undertaking and involved so much care and labor that it was not until about the middle of October that the transports were laden and the final shipment of troops took place. Those of the public who are so clamorous for a short, sharp and decisive war, and who seem to wonder why the Union forces have not long since been sent to operate on the southern coast will learn something by a perusal of the following details.

The expedition consists of the following vessels:

Steamers.	*Guns.*	*Commanders.*
Flag ship Wabash	58	C. P. R. Rogers.
Ship Minnesota	57	L. M. Goldsboro.
Ship Roanoke	54	John Marston.

Sailing Vessels.	*Guns.*	*Commanders.*
Frigate St. Lawrence	50	H. T. Purviance.
Sloop-of-war Vandalia	20	S. P. Lee.
Sloop-of-war Jamestown	22	J. F. Greene.
Sloop-of-war Cumberland	24	——
Sloop-of-war Savannah	24	—— Missroom.
Sloop-of-war Dale	16	—— Yard

Gunboats.	*Commanders.*	*Gunboats.*	*Commanders.*
Albatross	——	New London	——
Alabama	Lanier	Ottawa	Stephens.
Augusta	Parrott.	Pawnee	Wyman.
Curlew	Watmouth.	Pembina	Bankhead
Dale	——	Pengnin	Budd.
Florida	Goldsborough.	Pocahontas	Drayton.
Harriet Lane	——	Quaker City	Carr.
Iroquois	——	R. B. Forbes	Newcomb.
Isaac Smith	Nicholson.	Seminole	Gillies.
James Adger	Marshand.	Seneca	Amnen.
Mohican	Godon.	Unadilla	Collins.
Monticello	——	Yankee	——
Mount Vernon	Glisson.	Young America	——

The gunboats boats carry an 11-inch Dahlgren gun forward, and are armed beside with one rifled gun and from two to four 24-pounders.

The Ferryboats.—These are capable of carrying from 500 to 900 men, and are generally armed with six guns each. The following is a list of those sent with the expedition:—*Baltimore, Commodore Perry, Eagle, Ellen, Ethan Allen, Mayflower, Philadelphia, Pocahontas, Star, Stepping Stone, Whitehall.*

Steamers.	*Commanders.*	*Steamers.*	*Commanders.*
Ariel	Terry.	Locus Point	French.
Atlantic	Eldridge.	Marion	Phillips.
Alabama	——	Mantanzas	Leesburg.
Baltic	Comstock.	Mercedia	——
Belvidere	Phillips.	Ocean Queen	Seabury.
Ben De Ford	Haslet.	Oriental	Tuzo.
Champion	——	Parkersburg	Hoftman.
Cahawba	Baker.	Philadelphia	Barton.
Coatzacoalcos	Bocock.	Potomac	Hilliard.
Daniel Webster	Johnson.	Roanoke	Couch.
De Soto	——	Santiago de Cuba	——
Empire City	Baxter.	Spalding	Howes.
Ericsson	Cowles.	Star of the South	Kearnley.
Florida	——	Vanderbilt	La Fevre.
Illinois	Rathburn.	Winfield Scott	——

Sailing Vessels.	*Tuns.*	*Sailing Vessels.*	*Tuns.*
Great Republic	3,356	Zenas Coffin	338
Ocean Express	1,697	Golden Eagle	1,128
Courier	——	Gem of the Seas	——

Supplies.—The material outfit of the expedition includes a vast variety of objects, which, when enumerated, prove what knowledge and careful forethought was needed in those who superintended the operations. It may be said that it contains almost everything which a community would gather and take along if it were about to found a colony in some deserted island of the ocean. First and most necessary comes food. Besides the rations provided for the troops while they shall remain on board, the transports bear at least three and a half months' supplies of food of every kind for the great army which is to be landed. One ship carries out a cargo of water; and the department has already chartered and laden other vessels to send down further supplies of live stock, and other needed provisions. The *Ocean Queen* and other steamers take out, besides troops, such articles as shovels, picks, hoes, two-wheel carts, brick, cement, grindstones, lumber, prepared frames of houses and barracks, ready to be set up, cross-cut saws, immense quantities of sand bags, beams, &c.

Ammunition.—An immense store of shot and shell is on board; as also many huge columbiads, mostly the vast ten-inch guns, which do such fearful execution. There are also quantities of gun carriages and light guns for field operations. Of these many are Parrott guns, and all are completely fitted, ready for the artillerists' hands when they are landed—caissons, forges, and large quantities of grape, canister, shot and shell being with each battery—sufficient, one would think, for a campaign in the interior.

Wagons.—A great number of army transportation wagons are provided, over and above those which belong to each regiment, and which the troops took away with them. Extra camp equipage of every description is also provided, and a great number of extra arms and infantry equipments. This looks as though the government expected to arm the inhabitants among whom the troops will be landed.

Pilots.—We may add here that all the best pilots belonging to this city have gone down with the expedition. They were chosen because they are familiar with every point on the southern coast, from the Chesapeake to the Texas shore. Beside these pilots, a number of skillful and trusty coasting captains were engaged from Cape Cod. These men know every inch of the coast; have sailed into every harbor and inlet with their craft, and will be able to carry the ships

© 1861 SCIENTIFIC AMERICAN, INC.

into any port, great or small, on the Atlantic or in the Gulf, where the expedition may be ordered to land. The infantry equipments put on board are sufficient for at least ten thousand men. They include everything necessary to prepare the soldier.

Boats for Landing.—Several months ago the government began to provide itself with surfboats. We may say that the expedition carries with it not less than five hundred of these needed helps for landing troops—sufficient to effect a simultaneous landing of a great number of men. Beside these surfboats the government purchased several ferryboats, such as the *Ethan Allen* and *Commodore Perry*, formerly belonging to the Williamsburgh Ferry Company. These boats were strengthened by iron bulwarks, and also doubtless be used for landing troops, for which service they are well fitted, each boat being capable of transporting at least nine hundred men at a trip; and their peculiar build making it much easier to land troops from them than from steamboats of the usual form.

Surfboat men.—It is known that seamen, though able boatmen, are not always acquainted with the management of surfboats, or with the landing of men through a heavy surf. To prevent accidents, the Navy Department some months ago sent trusty agents to the shores of New Jersey and Long Island and secured the services of a sufficient number of the hardy wreckers of those coasts, men who played in the surf when they were children, and who have worked in it ever since. These brave and skilful men will guide the boats in which our troops land at the point of attack. In addition, the Navy Department recruited further among the skilled and patriotic seamen of Cape Cod and Cape Ann, numbers of whom eagerly volunteered to work for which, by long experience, they are peculiarly fitted. They will not only assist in working the boats by which the army will be landed, but will remain as part of the land force afterward.

Horses.—Of horses the expedition has nearly fifteen hundred. They are mostly on board the *Great Republic*, *Vanderbilt*, *Ocean Queen*, *Baltic* and *Ericsson*. One ship takes, as supplies for these animal, eight thousand bags of oats, and besides this other vessels carry further supplies of oats and corn, while many tuns of hay are divided among the transports.

Miscellaneous.—2,000 bushels of Cumberland coal have been taken along. This coal is of the finely broken kind used by smiths in their forges, because it gives a quick and very intense heat. Beside the two-wheeled dumping carts, there are also a great number of handcarts and barrows, especially of the latter. Of course every tool needed in constructing earthworks is found in this immense *omnium gatherum*. Three or four transports are partially laden with fire-brick, probably to be used, in conjunction with the fine Cumberland coal, for heating shot. Camp stoves are cheaper, handier and more quickly set up for cooking purposes, and the brick are most probably to be used in constructing furnaces to heat red-hot shot, with which the great columbiads will do good execution.

Commanders.—The naval part of the expedition is under command of Commodore J. F. Dupont, one of the ablest officers of our navy. He is of New Jersey by birth, but is now a citizen of Delaware, belonging to the family of Duponts, who are well known as powder manufacturers. Captain Dupont entered the navy December 19, 1815. He has, therefore, been in the service forty-six years; of which twenty-two years have been passed in service at sea, and eight years and a half in shore duty, in our various navy yards, where officers get excellent training in the preparation and use of arms and ammunition. The fleet Captain is commander Charles H. Davis, of Massachusetts. He is counted among the ablest and most skillful officers in the service. The flag-lieutenant, the remaining officer of the Commodore's staff, is Lieutenant S. W. Preston, a Canadian by birth, and a citizen of Illinois, from which State he entered the service in 1857. Commodore Goldsborough, of Maryland, an able officer, is also attached to the expedition, and will take an active part in aiding its operations. The land forces are under the command of Brigadier-General Thomas W. Sherman, of Rhode Island, who entered West Point in 1832. He is esteemed an able and distinguished officer, and was breveted "for gallant and meritorious conduct in the battle of Buena Vista." General Sherman's headquarters are on board the steamer *Atlantic*, which carries over 1,200 troops beside her own crew. Three brigades of the land force are commanded by Generals Viele, Stevens and Wright. Egbert L. Viele was graduated from the West Point Military Academy in the year 1842, and was a classmate of Gen. McClellan. He served in the Mexican war, and in 1853 resigned his commission to accept the position of Chief Engineer of the State of New Jersey. Since then he has been Engineer-in-Chief of the Central Parks in this city and Brooklyn. He is considered an able and experienced officer, and at thirty-six years of age ranked as a Brigadier-General. Isaac Ingalls Stevens, who is General in command of the Second Brigade, was graduated at West Point in 1839, and entered the corps of Engineers. He resigned in 1853, to accept the appointment of Governor of Washington Territory, and was elected as representative to Congress in 1857. Gen. Stevens was in Mexico, and was breveted Captain for gallant and meritorious conduct at Cherubusco, and was breveted Major at Chapultepec, Sept. 13, 1847. He was severely wounded on the same day. Horatio Gates Wright, commanding the Third Brigade, was graduated at West Point in 1837, and appointed a Lieutenant in the Engineers' corps in 1841. Since his graduation he has been an Assistant Professor and Professor at the United States Military Academy, and has the reputation of being a superior engineer and thoroughly efficient officer.

Troops.—The number of troops accompanying this expedition is variously estimated. Probably 20,000 is as high a figure as it is safe to state in the absence of positive information. A number of carpenters, masons and other artificers form a part of the material of the expedition, so that in setting up barracks and for other work skilled labor will be always at hand. Of artillery ammunition there are really immense quantities. Several of the largerst transports are nearly laden with these materials, and thousands of shells were sent off from this port, as well as shot, canister, and every variety of deadly missiles.

Footballs.—A curious item in the stores carried by the expedition consists in several hundred footballs. These were put on board for the exercise of such portions of the army as may remain in garrison at the point where a landing is made, and where defences will, of course, be at once erected.

To drive the extra transport wagons before mentioned the government enlisted in this city nearly two hundred professional stage drivers. These Jehus will be most serviceable on the southern roads, where, as Mr. Olmstead relates in his journey through the South, northern stage drivers are found the only competent men to take charge of stages in the various inferior lines.

In our next number it is probable that we will be able to announce the result of this formidable expedition.

GEN. M'CLELLAN.

The newspapers are publishing the rumor that Gen. McClellan is to be removed from the command of the army on the Potomac, and that some new man is to try his hand. We do not believe one word of it, and we think the newspapers do very wrong in publishing such stuff. It weakens the influence of a commanding officer to intimate a want of confidence in his military ability. Some of our newspapers, in their zeal to publish the news, regardless of its effects, are doing injury to the cause, and the government would be justified in putting its hand upon them unless they show more consideration for the interests of the people. We are for a free press, but not for such freedom as will frustrate the purposes of the government in its attempts to suppress a formidable rebellion. It must be evident to all that the government needs the united support of every citizen, for it has shown many signs of weakness, too many, indeed, not to cause alarm among all thoughtful minds. The labor which Gen. McClellan has performed since he took command of the army on the Potomac is unparalleled in the history of warfare. After the battle of Bull Run the army at Washington was nothing more nor less than an unorganized mob. By his untiring devotion and energy it has become a formidable army of upward of 200,000 men, well disciplined and ready for action. All honor to the brave young General.

From the 19th of April to October 26th, seventy vessels of war were fitted out at the Brooklyn Navy Yard. Many of these are first-class ships, and the entire number is larger than the number of vessels in commission at any time previous to the rebellion since the formation of our navy.

Since the first commitment, July 20th, there have been one hundred and eighty prisoners sent to Fort Lafayette. Of these, Charles Barklay has been removed to Bedloe's, and Marshal Kane to Governor's Island; nine privateer prisoners have been taken to the Tombs to await their trial; and ninety-six have been discharged upon taking the oath of allegiance, leaving on October 25th seventy-three prisoners.

The *Bavaria*, which arrived here Oct. 10, brought a large invoice of guns. The invoice consisted of 259 cases, containing 6,222 guns, valued at $52,800, or about $8 50 per gun. These were sent to the arsenal at Bridesburgh, Pa., near Philadelphia. The same vessel brought swords, rifles, &c., for Gen. Fremont's army. In addition to these arms, a large number of Enfield rifles have recently arrived by the *Edinburgh*, *Kangaroo* and *City of New York*.

Major-General Halleck.

The special correspondent of the London *Times*—Dr. Russell—in a recent letter to that journal, states that great expectations are based upon the newly-appointed Major-General Halleck, who is soon expected here from California. Henry Wager Halleck is a New Yorker by birth. He entered the West Point Academy in 1835, was graduated in 1839, ranking third in his class, and entered the army as Brevet Second Lieutenant of Engineers, his commission bearing date July 1, 1839. He remained at the Military Academy until June of the next year as Acting Assistant Professor of Engineering: in 1841 he published a work on "Bitumen and its Uses," was made First Lieutenant in January, 1845, and published an able work on the "Elements of Military Art and Science" in 1846. Shortly after the Mexican war broke out Lieut. Halleck was sent to California, and in September, 1848, he was breveted Captain "for gallant conduct in affairs with the enemy on the 19th and 20th of November, 1847, and meritorious service in California, May 1, 1847."

In California he was engaged in the military government, as Secretary of State, under Gen. Kearney, Col. Mason and Gen. Riley, from 1847 to December, 1849. Afterward he became Chief of the staff of Commodore Shubrick in the further united naval and military operations on the Pacific Coast. He was also a member of the convention which met in 1849 to frame the constitution of the State, and was on the committee which drafted the constitution. He was made Captain of Engineers in July, 1853, and resigned his commission August 1, 1854. Since the breaking out of the present war the government has recalled him to the army, and he returns now with the commission of a Major-General, dating from August 19th of the present year. Orders were sent to Gen. Halleck some time ago to report for duty in Washington, and it is reported that he left the Pacific side on the 1st of October. He may therefore be expected in Washington in a few weeks.

RAPID PRODUCTION OF RIFLED CANNONS.—The machinery has been so much increased at the Phœnixville Iron Works, Pa., that five finished wrought iron rifled cannons are turned out daily. The number already completed is eighty. A regular trial of the strength and power of these guns is to be made in a short time, at the Works. The capacity of the Iron Works for rolling the cannons and turning them out in the rough, is equal to about fifteen per day, and a number have to be finished outside.

ANOTHER BURNING OIL WELL.—A correspondent of the Buffalo *Express* writes that a short time ago a fountain well was opened on the Blood farm, four miles from the mouth of Oil creek, in Venango county. A stream of oil four inches through spouted some sixty feet into the air before the workmen could remove their tools, and, quick as lightning, burst into flame by the engine fire. For several days it burned without any diminution of force, a perfect column of fire and smoke. No persons were seriously though some were slightly burned by the explosion.

TAKE of pure glycerine, 13 drachms, starch, 20 drachms, volatile oil of mustard, 80 drops, mix them. This preparation affords a sinapism always ready for use.

© 1861 SCIENTIFIC AMERICAN, INC.

ORDER OF STUDIES.

We observe in several of our exchanges the following paragraph :—

THE CART BEFORE THE HORSE.—*Mother to Teacher.*—My daughter has finished her French, and Italian and music, and now she had better take up her English branches.

The extent to which this paragraph has been copied without comment shows that the community has bestowed very little thought upon the subject of the order in which children should take up their studies. This matter is not inferior in importance to any other subject whatever. As the mind is developed from infancy, it becomes, in successive periods, adapted to the various studies embraced in education, and the several studies should be presented in the order in which they are fitted to the degree of the mind's development. Early childhood is the period at which the faculties are best adapted for the learning of languages. A child from four to eight years of age will learn the French language in one quarter of the time in which any adult can learn it, and the child will learn it more perfectly than the adult can by any amount of study whatever. To master a foreign accent the organs of articulation must be trained while they are in the process of formation. It is as easy for a young child to learn the French pronunciation of *maintenant* as the English pronunciation of *now*, but we should like to see any adult American who could pronounce the French word in Paris without being detected as a foreigner.

It is not only the pronunciation that adapts the study of language to childhood, from the greater mobility of the organs, but the mental labor is just fitted to the power of a child's mind. In the conjugation of Latin verbs there is a nonsensical jingle that has the same charm for a child's ear as Mother Goose's melodies. If properly presented, a child will learn with as much ease and pleasure,

es vel esto
esto
este vel estote
sunto,

as it will

Hi, diddle, diddle,

or,

Dickery, dickery, dock.

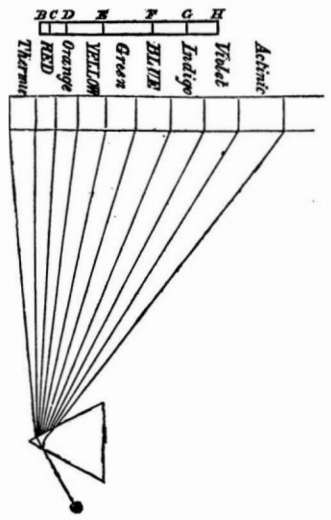
There is no grasp of thought nor power of comprehension required in learning these conjugations. The intellectual effort employed is of a puerile character, and this very character makes the study peculiarly repulsive to persons of mature minds. We have known more than one man of middle age to attempt the study of the German language, and to recoil before the childish labor of learning the declensions and conjugations. If a parent intends that a child shall ever learn a foreign language, the best time for him to do it is in his early years.

THE SPECTRUM.

In the year 1701, Sir Isaac Newton published his work on optics, and in it made known to the world his great discovery of the analysis of light. He had found that if a beam of light was passed through a triangular prism, it was refracted or bent from its course, and separated into seven beautiful colors, which falling upon a wall or screen produced an elongated oval image that is called the spectrum. For the last 160 years the spectrum has been the subject of an immense amount of study and observation among all civilized nations, but it never before occupied the prominent position in the world of science which it holds in this year 1861. The cut shows the order in which the colors of the spectrum are arranged, the red being bent the least and the violet the most.

It has been discovered that the prism, besides separating the sunbeam into seven colors, also divides it into three elements, viz., light, heat and the chemical or actinic rays; the last being those that produce the picture in the daguerreotype and photograph, as well as all the other chemical effects of what is called light. The luminous rays are refracted more than the heat or thermic rays and less than the actinic, though both the heat and actinic rays mingle with the luminous at their respective ends of the spectrum. Hence, violet and blue light acts very energetically on the photograph sheet, while the yellow light does not act at all. Every photographer has a room with the windows glazed with yellow glass, or shaded with yellow curtains, in which to work on his sensitive paper.

In 1801, just a hundred years after the publication of Newton's work, Wallaston discovered that if the ray of light, before entering the prism is passed through a narrow slit, the spectrum is crossed by several dark lines. These were subsequently examined by Fraunhofer, who named seven of the principal ones from seven letters of the alphabet, B C D E F G H. The engraving shows the position of these in relation to the colors of the spectrum. A more careful examination of the spectrum, by means of magnifying lenses, has revealed the existence of several thousands of these dark lines, and an investigation of these has



given us the new method of spectral analysis, the results of which are among the most wonderful of all the marvels of science. This method, not only enables us to detect the presence of elements in quantities of inconceivable minuteness, but it has led to the sublime discovery that some of the substances with which we are familiar on this earth also enter into the constitution of the sun and stars.

When any metal or other element is burned in a colorless flame, like that of an alcohol lamp, it gives a peculiar color to the flame, and if the light is passed through the triangular prism, each element produces its own peculiar spectrum, and the spectra of several of the elements are crossed by bright lines in the same position as some of the dark lines of the solar spectrum.

The next great step in this most wonderful investigation, was the discovery that if the flame of an artificial light is interposed in the path of the sun's ray, then passed through the prism, the bright line of the spectrum from the artificial light disappears, and its place is occupied by the corresponding dark line of the solar spectrum, which is deepened by the passage of the light through the colored flame. The flame of every substance seems to have the power of absorbing, or rather of dispersing, the rays which produce its own bright line or lines, so that light passing through a flame has a dark line across its spectrum in the same place as the bright line of the spectrum from the flame.

This fact last stated, led to the discovery of the composition of the sun. It is inferred that the light comes from the solid body of the sun, and passes through an atmosphere of flame, or of highly heated vapors of various substances, each of which absorbs the light that would produce the bright line in its own spectrum. Hence the solar spectrum is crossed by dark lines corresponding to the bright lines in the spectra of various substances. As there is a dark line in the solar spectrum in the same position as the bright line in the spectrum of burning potassium, it is inferred that there is heated vapor of potassium in the sun's atmosphere; and as there is no dark line in the solar spectrum corresponding with the bright line in the spectrum of lithium, it is inferred that there is no vapor of lithium in the atmosphere of the sun.

Each star appears to have its characteristic spectrum, revealing to man the knowledge of its composition. Chemistry, following in the sublime path of astronomy, is extending the field of its investigations over the visible universe. Every ray of light that comes from the distant worlds above, beneath and around us, though its swift flight continue through years or through centuries, bears in its constitution the ineffaceable record of its origin, and conveys to human intelligence, across inconceivable distances, a knowledge of the substance from which it issued forth.

A Railway Across the English Channel.

[From the Mechanics' Magazine.]

In the introduction to a recently-published work upon the "Channel Railway," Mr. Chalmers reviews the different methods proposed for effecting railway communication between England and the Continent. There are, he states, three ways of accomplishing this object: through the earth by tunneling under the bed of the sea, through the water within submerged tubes, or through the air on a bridge. Twelve projects, including Mr. Chalmers's, have already been brought before the public. Judging from the names, seven appear to be French and six English; but if that of Mr. De la Haye, of Liverpool, be classed with the latter, there are six of each nation. Three projectors, all French, propose tunneling under the Channel; seven, two French and five English, propose submerged tubes; a Frenchman proposes an arched roadway or tunnel on the bottom, and an Englishman a mammoth bridge.

A French engineer, Mathieu, sixty years ago, prepared plans for tunneling under the Channel, and laid them before Napoleon, then First Consul; they were exposed for some time in the Luxembourg and other public galleries in Paris, but are now said to be lost. In 1856–57, M. De Gamond also proposed a tunnel, and his plans received more than ordinary notice. A commission of engineers appointed to examine them made a favorable report, and recommended an appropriation of £20,000 to make experimental examinations. The Emperor is said to have favored the project, but it was finally rejected on account of its interference with the navigation of the Straits. His plan was to form in the Channel thirteen islands by carrying material out to sea, dig down through these islands into *terra firma*, and tunnel east and west. M. De la Haye proposed the construction of wrought iron tunnels in separate divisions, sinking them in the bed of the water and then connecting them. The part of the tunnel near the shore would be sunk underground, and covered with stones fastened together so as to render them immovable. M. De la Haye believes that the sum of £8,000,000 sterling would be quite sufficient to complete his submarine railway. Another projector has proposed a somewhat similar plan, but supposes that the submarine railway should be sloped to "admit of a motion sufficiently powerful to enable the carriages to cross the Channel without a steam engine. According to an estimate made, the cost might amount to £87,400,000." Another projector proposes to place the tube containing a single line at a uniform depth from the surface, by means of ties below (and buoys above if necessary), at suitable intervals. The proposer of the arched road or tunnel on the bottom, will, with forty subaqueous boats (of which he is the inventor), 1,500 sailors and navvies, 4,340,000 cubic yards of material, and £10,000,000, undertake to construct a tunnel by means of which the Straits can be crossed in thirty-three minutes. The projector of the Mammoth bridge proposes to raise in the Channel 190 pedestals, 300 feet square at the bottom consisting of rocks bolted and lashed together, gradually rising at an angle of 75° till they form each an insular plain 150 feet square, 40 feet above the level the sea. On them he proposes to build towers 100 feet diameter, 260 feet high, and crown the whole with a tubular bridge 50 feet deep and 30 feet wide.

[Mr. Chalmers has sent us his pamphlet. His scheme seems to be well digested, and is not an impossibility; but it is not probable that it will be carried out within the next twenty years at the shortest date. The Atlantic Telegraph and various other great necessary schemes will be completed before the Channel Railway is constructed.—EDS.

OIL OF IRON.—When cast iron is dissolved in dilute sulphuric acid a peculiar oil is also formed. This substance has long been a puzzle to chemists. Chevreul, the French chemist, has stated that perhaps nitrogen was a constituent of this oil, but late investigations by Professor Cameron, of Dublin and Emerson J. Reynolds, of London, have conclusively settled the question as to its identical character. It contains no nitrogen; it is chiefly composed of carbon and hydrogen.

© 1861 SCIENTIFIC AMERICAN, INC.

California News Items.

The *Alta California* has received samples of good cotton grown in the Great Basin of Salt Lake, and indulges in very hopeful speculations in regard to the subject. The Sacramento *Union*, however, asserts that the altitude of the Great Basin is too high for the successful cultivation of the cotton plant, and designates the bottom land of the Sacramento and San Joaquin rivers as giving much better promise of success. This land corresponds in its general characteristics with the best cotton districts of the Gulf States. The only want is a supply of labor of the right kind.

Beavers on the San Joaquin.—These industrious little creatures—beavers—are still to be found on the San Joaquin, though by no means in as great numbers as in former days. They live back from the river among tules and flags and about small lakes, and their houses are great curiosities. They are built with pillars and rafters, very scientifically, and are covered with mud. As their families increase, the roof is raised to accommodate the new comers, and the walls built up to meet it. They always have a passage from their houses to the river, boring a hole through a bank where the land, for several feet in, is much higher than that where they live. The river works through these holes cuts sloughs which are called "beaver sloughs." The male and female always go to the river together, and if one gets into trouble the other helps him or her out or runs for help. Beaver traps are placed just under water where they come to the river. They are not unlike an ordinary fox trap and are chained to the bank. No bait is put upon them, but the trappers merely trust to the creature "putting his foot in it" by accident. Sometimes, if the beaver does not drown too quickly, his community save him by eating off his imprisoned leg. It is seldom that a lazy beaver is seen. "Work like a beaver," is a proverb; but those who have watched them say that once in a while there is an instance, and that the culprit is brought out and soundly beaten by a committee. The farmers on the San Joaquin, and we suppose elsewhere on rivers, have a plan when they wish to raise up land which is lower than the river at high water, to run the river over it and the stream leaves its sediment, which in some cases amounts to two or three feet of soil in a year. The beavers, by cutting these sloughs through the banks, have, in the course of years, raised up many acres far more effectually than the hand of man could have done it. The above is told us by the farmers who occupy the land thus raised, and we have no reason to doubt it. There are beaver houses, we are told, within less than five miles of Stockton.

The Steam Fire Engine at Sacramento.—Donohue's steam fire engine, *California*, was tried publicly at Sacramento, on the 23d of last September, in the presence of a large concourse of people, continuing in constant exercise, with the exception of time necessarily used in detaching and attaching the different-sized pipes, from about 4.15 P. M., till 5.45 P. M. All present were much pleased and satisfied with the exhibition.

California Farming.—On the mammoth farm, about fifteen miles from Sacramento, in Yolo county, partly owned by Gen. Hutchinson of the St. George hotel, was produced, this season, 1,000 acres of wheat, 1,000 acres of barley, and 1,800 tuns of hay. The full yield of wheat averaged 30, and barley 40 bushels to the acre; the produce is estimated at 60,000 bushels, at $1.50 a bushel, or $80,000. The hay would foot up $20,000. Thus this farm will yield a total of $100,000 this year. The *California Farmer* states the sales of fruit from the farm of G. G. Briggs of Marysville, last year, "were greater than any gold mine in California, amounting to over $100,000."

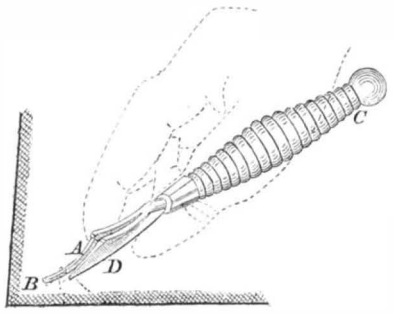
Improvement in Street Lanterns.—*Le Génie Industriel* gives an account of improvements in street lanterns, for which a patent has been secured in Belgium, by M. Jobard, of Brussels. He places metallic mirrors in the upper part of the lantern, at the proper angle to reflect the light, which now goes upward into the sky down into the street.

Grain of all kinds is arriving at Chicago at the rate of two millions of bushels per week, and an amount ranging from one to two millions is weekly shipped, chiefly for the ports of England and France.

NEW TOOL FOR TAILORS AND SEAMSTRESSES.

The removal of the basting thread from garments after they are sewed, especially after being stitched in some machines, is a troublesome operation.

The accompanying figure represents a very convenient little tool for cutting and removing such thread. A is a blade bent downward. Its point, B, consists of a finger-like prong. The blade terminates in a shoulder which prevents the thread from slipping beyond the cutting edge. In using this instrument the prong, B, is thrust under the basting thread and forced upward. This action will usually pull out



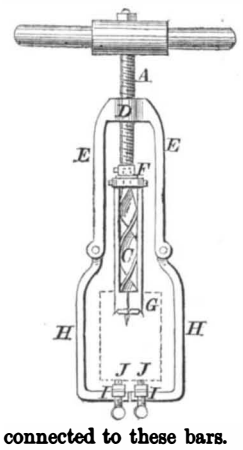
much of the thread, but when it has to be cut, the blade, A, is thrust under the thread, when the edge cuts it.

For the purpose of drawing out the ends of the thread from the cloth, the tool is also constructed to grasp like the finger. D is a spring jaw attached like the knife to the handle, C. The prong, B, and blade, A, are formed with their flat sides next the spring jaw, and the latter is slightly turned out at the point. The end of the thread is received between the spring, D, and the prong, B, and by pressing upon the tool, as represented, the thread is quickly grasped and then drawn out by an upward movement.

Patented Feb. 21, 1860, by Timothy Sullivan, of New York city.

MORTISING AUGER.

The most common method of forming rectangular and square mortises in timbers for bridges, buildings, &c., is by marking out the size of mortise desired on the face of the timber, then boring one or several holes, after which the mortise is squared and cleaned out with a chisel and mallet. The combination of an auger and hollow chisel for the purpose of forming mortises at one continuous and expeditious operation is represented by the accompanying figure. A is a screw shank with an auger, C, on its inner end. This screw works in the shoulder, D, which is hollow and constitutes a nut. E E are stirrup bars; F is a loose collar on the screw shank, It has two vertical parallel bars attached to it on the outside of the auger. The hollow chisel, G, is connected to these bars. H H are jointed bars attached to another set of jointed bars, I I, which are situated at right angles to the former. The other bars, J J, are also attached by joints to the bars, I I.



This tool is used for making mortises as follows:—The timber to be operated upon is represented by dotted lines. It is placed on the supporting bars, J J, which are adjusted by screws, as represented, so as to secure the stick of timber in the exact position for operation. By turning the handle, the auger, C, enters the timber and performs its usual functions, and at the same time the chisel, G, follows, cutting downward in consequence of the action of the screw shank, A, in the hollow nut, D. In this manner a rectangular mortise is formed at one continuous operation by turning the handle of the tool. This is a convenient and portable mortise auger, which can be readily adjusted to its work, and is very suitable for operating upon timbers that are laid upon the ground, intended for building purposes.

Patented Jan. 10, 1860, by Thomas Board and Chas. N. Austin, of Jackson, Va.

New Blue Color.

The following is from the Paris correspondent of the *Photographic News*, London:—

The production of new coloring materials is certainly one of the most remarkable events in the chemical science of the present day; and in this particular coal tar has played the most prominent and important part. M. Ruhlmann has just made public his discovery of a new blue color obtained from cotton-seed oil. This color is chemically pure; burned on a slip of platinum it leaves no ashes; every effort to obtain it in a crystalline state has failed. At a temperature of 68° Fah. it is soluble in alcohol of 90° only in the proportion of 1.30 per 100, and in 12 per 100 in pure ether; by the aid of heat it is dissolved more freely, to be deposited in a granulated state upon cooling.

In cold alkaline solutions it is insoluble, but by a long ebullition a small quantity is dissolved, which slightly colors the liquid green.

The new color is slightly soluble in chloroform, and in sulphide of carbon. In contact with concentrated sulphuric acid, it is dissolved, and assumes a purple color. Upon adding water to this solution the blue color reappears, and is completely precipitated. Boiling phosphoric, hydrochloric, and acetic acids have no effect upon it.

The reducing agents generally, such as nascent hydrogen, sulphurous acid, the protoxides of iron and of tin, and of arsenious acid, do not affect the splendor of the new color, while the oxydizing agents, such as nitric acid, chromic acid, perchloride of iron, chlorine, bromine, iodine, destroy it immediately upon contact.

The new color is obtained by keeping the cotton oil at a temperature of 212° Fah., for five or six hours, with 3 to 4 per 100 of concentrated sulphuric acid. This contact of oil and acid must be prolonged until the green color of the oil is changed into a deep blue color. The blue substance thus obtained contains 48 per 100 of fatty acid; it retains a little free sulphuric acid and some sulphate of soda or sulphate of lime. Repeated washings with warm water separate these latter products, and the separation is still more complete when, after washing in water, the blue substance is dissolved in alcohol, and afterward precipitated by water, which retains only a trace of it, but which separates the acid and the sulphates which escaped the washing. In order to separate the fatty body the blue substance must be washed many times successively in naphtha, which also dissolves a little of the blue color so long as any of the fatty body remains in the mixture, but which dissolves only a trace of it when these washings have been several times repeated. Analysis shows its composition to be C34 H24 O8=

C	69.87
H	8.22
O	21.91
	100.00

It is difficult to avoid regarding this substance as a new definite organic compound, which combines with nitric acid, chloride, iodine and bromine.

The best mode of practically applying this new pigment remains to be discovered; but when we consider that it resists the action of the most powerful acids, viz., concentrated phosphoric and sulphuric acids, like indigo, and of other agents which destroy the color of indigo, such as boiling perchloride of tin, and muriatic acid, it may be expected that indigo and prussian blue have encountered a formidable rival in this new blue.

Savans in a Salt Mine.

During the late meeting of the British Scientific Association at Manchester, a party of the scientific dons went upon a visit to the Marston salt mine, at Norwich. This mine is said to be one of the largest and most remarkable in what is called the "Cheshire Salt Basin." The deposit of salt exists in several beds alternating with colored marls and gypsum. The mine is about thirteen acres in extent, and the descent to it was made in tubs—five of the *savans* being seated in one tub going down and coming up. As there were two hundred and fifty of the party, and some of them very portly gentlemen, they had a sore trial of their patience, the mine being three hundred and sixty feet deep and it taking two minutes and a half for each cargo to go down. The mine was lighted up for them with three thousand candles; the lights flashed from innumerable saline pendicles, and the effect was grand. The miners moved about in appearance like inhabitants of the infernal regions, performing the operations of blasting the saline rocks for the edification of the dons of science.

Coal Oil Commerce.

Coal oil forms quite a regular business of transport for the Philadelphia and Erie Railroad.

The number of barrels containing crude oil transported over this road to New York for the past nine months, from Jan. 1st to Sept. 30th, was as follows:

January	15,092	June	7,685
February	9,621	July	11,896
March	4,383	August	17,197
April	5,521	September	18,375
May	7,228		

Total barrels carried in nine months.....96,998

For the year the oil trade of the road will almost reach 150,000 barrels.

The aggregate remittances received through the mails yearly by the proprietors of the New York daily and weekly newspapers amount to upward of five millions of dollars.

© 1861 SCIENTIFIC AMERICAN, INC.

SOME FACTS IN THE HISTORY OF CHEMISTRY.

BY PROFESSOR SEELY.

On Friday evening, Oct. 25th, Prof. Seely delivered a public lecture introductory to his course on Chemistry and Toxicology at the New York Medical College. He said that he should take the occasion to explain exactly what chemistry is, and to present some of the prominent facts in its early history.

What is the science of chemistry? What is science? In its etymology science is synonymous with knowledge. The word is from the Latin *scientia*, wisdom or knowledge. But the term has acquired a meaning different from this. A man might know all the facts of nature that are known in the world, and yet not be a scientific man. Science is knowledge classified. When we have but few facts there is no occasion to classify them, but when they accumulate in great numbers, in order to render them available they must be arranged in classes.

Our knowledge of the universe naturally divides itself into three great departments, natural history, natural philosophy or physics, and chemistry. Physics examines the forces which put bodies in motion, gravity, light, electricity, &c. Natural history describes plants, animals and minerals as individuals and arranges them in genera and species. Chemistry inquires into the minute composition of substances. It tells us what bodies are made of. All of these sciences, however, intermingle at their confines, and in many places it is impossible to fix precisely the boundary between them. Chemistry is the most complete in itself. It is the most perfect of all the sciences.

As a science, chemistry is only one hundred years old. There are men now living who have seen it grow up. But as an art it is as old as the human race. Adam probably cooked some of his food, and thus practiced the first chemical art. Arts always precede science. We must collect our facts before we can classify them. The Chinese practice many chemical arts, some of them with skill surpassing that of Europeans. There are mysteries to our artizans even in the manufacture of their tea chests. But they have no chemical science, and they are making no progress in their arts. Two thousand years ago they knew as much as they do to-day.

The science of chemistry was preceded by alchemy. The first of the eminent alchemists was Geber, an Arabian physician, who lived in the seventh century after Christ. He devoted a great deal of research and labor to the scheme of changing the baser metals into gold. This was the favorite dream of the alchemists. Geber pretended to have made the discovery, and it is said wrote 500 books in which he professed to explain the process. But these were wholly unintelligible, and from this we derive the term gibberish.

In the fifteenth century Basil Valentine acquired great fame as an alchemist. He enlarged the materia medica by the introduction of several new substances, among which was antimony. It is said that, having used some of this metal in his attempts to commute iron to gold, he threw it out where it was eaten by swine; and observing that the hogs became very fat and sleek, he gave some antimony to his brother monks. The result, however, was less fortunate than in the case of the swine, for the monks took the new medicine in such quantities that several of them were poisoned to death. From this circumstance the metal was called, from the French word *moine*, monk, antimoine, anglicized to antimony.

I will mention one other name of the middle ages, which is familiar to all of us, Glauber. He gave his name to the sulphate of soda, a substance which he discovered, and which is still called Glauber's salts. All of the alchemists obtained money, not only by curing diseases and selling secrets, but also by telling fortunes from astrology. Though they were the great men of their day, they were all humbugs.

Coming down to the last century, however, we find the names of really great men; when Priestly and Scheele and Lavoisier laid the foundations of modern chemistry. But I shall have occasion to mention their labors and discoveries frequently in the course of my lectures, and will not attempt to give a history of them at this time.

The lecture concluded with the exhibition of a few brilliant experiments. We have not given a full report of it, but have mentioned only those salient points which we thought would interest many of our readers. Though this course of lectures is addressed to the students of the New York Medical College, we understand that tickets may be procured by a limited number of persons not connected with the institution, and if any of our citizens desire to attend a course of lectures on chemistry they will find this an excellent opportunity. Professor Seely is not only a man of extraordinary acquirements in chemical science, but he is one of those clear-headed men who understand thoroughly what they know; and he has a rare faculty of imparting his ideas to others.

REMARKABLE BO LER EXPLOSION.

On Saturday evening, the 19th ult., the boiler and machine works of I. P. Morris & Co., at Richmond Hill, Philadelphia, were the scene of a very remarkable and mysterious boiler explosion. The operatives, numbering about 500 persons, had all quit work and departed with the exception of the engineer, Patrick O'Neil, and two laborers, John Parker and Thos. Hibbard, who were in the boiler room, which was a brick building having very strong walls. In this room there were four boilers, one of them being much larger than any of the other three, and was the one that had been used during the day. With a roar like the discharge of Rodman's huge cannon, one end of the boiler was driven east like the end of a child's drum, while the rest of the boiler was lifted from its seat in one mass and driven through the walls of the room, making a complete wreck of the building and doing great damage to the adjacent houses. The engineer and one of the laborers were instantly killed, and the other, John Parker, was severely injured.

The coroner's jury held an inquest on the 21st on the bodies of the two men who lost their lives, and some peculiar testimony was elicited. The foreman, Mr. T. Scott, stated that at 5 o'clock there were only 63 pounds pressure of steam on, and the boiler was rated to carry from 75 to 100 pounds with safety. About twenty minutes past five the fire of the boiler was allowed to cool down, and soon afterward it was pulled from the furnace.

Mr. W. Jones, one of the engineers of the company, testified that he was in the main building of the establishment when the explosion took place. He stated that after the fire had been drawn from the furnace the engineer turned on a stream of water from a tank 30 feet high to extinguish it. This stream of water was found running from the hose when the rubbish was cleared away. He was of opinion that some of this water had been poured into the furnace, and by suddenly cooling the heated metal of the boiler it had cracked. This, in his opinion, was the cause of the explosion. The jury, however, did not agree with the engineer, as they brought in a verdict that they were unable to account for the accident. It would appear as if the throwing of the water upon the heated coal in the pit of the furnace led to the explosion; therefore this should be a lesson to all engineers and boiler firemen in cooling down their fires.

Report of the Sanitary Commission.

The associate secretary of the Sanitary Commission, Dr. J. H. Douglass, of Washington, has presented his report of his inspection of the camps. He says that the health of the army is remarkably good, and its condition, on the whole, quite satisfactory. He anticipates, however, considerable increase in the sickness in some of the regiments which are supplied with badly ventilated tents as soon as cold weather shall compel the men to sleep altogether in their tents. He dwells at considerable length upon the importance of ventilating tents, citing authorities to prove that the most common cause of disease in armies is the breathing of air which has passed several times through the lungs. Dr. Douglass thinks that the Sibley tent is the best one at present in use.

We copy from the report the following in relation to the use of quinine, which, it will be remembered, was recommended by the SCIENTIFIC AMERICAN:—

In but one regiment has any prophylactic for malaria been used—First Minnesota. Quinia bitters were furnished to the surgeon of this regiment (Dr. Murphy) by the Commission. He reports in general terms most favorably as to its effects, and requests a further supply. The region of country occupied by this regiment—low wet ground near Edwards's Ferry—has the reputation of being very subject to malarial fevers. I would recommend that a supply of the bitters be sent to this regiment, as well as to those of the adjoining brigade, subject to the same influences.

The Experience of an Inventor.

MESSRS. MUNN & Co.:—Yours of the 18th is received informing me of your success in securing every claim (if I forget not,) six in number, on my cider and wine mill and press. When we consider the great number of patents, as well as the great number of rejected cases on machines for this purpose, we at once come to the conclusion that the application has been presented to the office with great skill, otherwise every claim would not likely have passed on the first examination. If I could reach the ear of every inventor I would say, "Never employ an incompetent agent, or bother your own brain with your application." My personal experience in nine cases illustrates fully what I say. In my first application I employed an incompetent agent, and after a delay of over eight months the case came up for examination and was returned to my agent to be rewritten. After additional delay and innumerable "extra expenses," the agent lost the original papers, and disappeared, and my application went to the winds. Another case was rejected, when my agent informed me that if he had copies of the drawings and specifications of interfering cases he could succeed. At the cost of an *extra hundred dollars* I procured these and the patent was finally granted. But all this expense and delay might have been avoided by giving the case to your agency. Other applications I have made myself which have been a continual annoyance to me. The four cases which I have entrusted to you from the start have given me no trouble and have not cost me a dime outside of the regular fee. Hoping that you will be equally successful in the remaining case, I remain, yours respectfully, J. R. GATES.

Louisville, Ky., Oct. 24, 1861.

[The unfortunate experience of Mr. Gates in the early career of his taking patents is the same as most inventors have had who have undertaken to make their own applications. And many who have employed inexperienced and incompetent attorneys have related to us incidents far more unfortunate in their results than those mentioned by Mr. Gates. —EDS.

Astounding Gold Discovery.

The *Bankers' Reporter* states that the following comes from a respectable source, but it certainly appears to be about as reliable as the story of Alladin's Wonderful Lamp.

It has has been a great mystery to English bankers, and to the directors of the Bank of England, how the bullion of the Bank of France could be so greatly increased within the last three years, while the institution has been constantly sending gold to England, to Germany and to America. Not long since the Bank of France drew some fifteen millions francs in silver from the Bank of England, which it paid for in gold bars with the French mint stamp on them. At its last report it showed a balance of one hundred and seventeen millions francs in gold, while the amount one year ago was under eighty millions—nearly one-third increase.

It is whispered that this abundance in gold is the result of a scientific discovery, which the Emperor Napoleon has secured the monopoly of. Gold is at the present moment manufactured at Paris in a secret manner. The principal articles used are not lead and arsenic, and though it is not known how extensively the precious metal is produced, yet several hundred weight of the material are taken to a certain place on the first of each month. Everything is conducted with the utmost secrecy. None of the workmen are allowed to leave, and nothing definite can be known; but the fact that gold is produced is beyond peradventure. How long Napoleon III. will be able to keep this wonderful secret remains to be seen.

Lake Superior Minerals for the World's Fair.

The Lake Superior *Miner* says:—

Alfred Mears, Esq., is now packing one of the best selected cabinets ever sent from this country for shipment to the approaching exhibition in London.

It will be consigned to the care of Monsieur F. A. Artault, our Commissioner to the great fair, and by him exposed with his own selection to the admiring gaze of tens of thousands who will doubtless look with incredulous eyes on the lumps and chips of native copper, and the still more curious and interesting nuggets and crystallizations of native silver they contain.

Mr. M.'s cabinet will contain over 200 specimens, many of them the best we have ever seen—not of the most value intrinsically, but containing the greatest variety of the "freaks of Nature in her solitary abodes."

ENGLAND'S communication with her provinces in the East will be greatly accelerated by the submarine cable between Malta and Alexandria, which has just been successfully laid. The direct distance between these places is 850 niles, but in order to secure shallow water, the cable was carried over 1,300 miles.

An explosion of fire-damp took place on the 23d ult. in a colliery at New Mines, Pa., by which David Glover, the manager, and a mule driver, were instantly killed. The pit gas was ignited by the flame of an open lamp carried by the mule driver.

© 1861 SCIENTIFIC AMERICAN, INC.

THE McCORMICK REAPER EXTENSION CASE.

Decision of the Commissioner of Patents.

Cyrus H. McCormick, a citizen of Chicago, in the State of Illinois, filed in the Patent Office, in due form, on the 6th day of November, 1860, his ten several petitions, setting forth that, on the 23d day of October, 1847, Letters Patent numbered 5,335 were granted to him for the term of fourteen years from and after that date, for certain improvements in reaping machines; that said Letters Patent have since, in due form of law, been surrendered and divided into ten several new Letters Patent, numbered, respectively, 816, 817, 818, 819, 820, 821, 822, 823, 824 and 825, each of these patents being for a distinct and separate part of the machine originally patented; that the term for which the said patents were granted being about to expire, and the applicant having failed, without fault or neglect on his part, to derive from the exclusive sale and use of his inventions intended to be secured to him by his said patents, a reasonable remuneration for the time, ingenuity and expense bestowed upon the origination and introduction into use of said invention, he desires an extension of the term of said ten patents for seven years, from and after the term for which they have already been granted.

The applicant, in accordance with the provisions of the law, subsequently filed a statement, under oath, of the ascertained value of his invention, and of his receipts and expenditures, with a view to exhibit in detail a true and faithful account of loss and profit, in any manner accruing to him, from and by reason of his said invention.

Due notice of these applications was given, by printed publication, pursuant to the act of Congress. Contesting parties appeared and filed their reasons of opposition to the extension, and a large amount of testimony, on both sides, was taken.

The 11th day of February, 1861, was fixed by the Commissioner of Patents as the day for hearing the application; but a special resolution of Congress, passed on the 9th day of February, 1861, extended the time of taking testimony against the application ninety days, which rendered it necessary for the hearing to be postponed until the expiration of that time. Elaborate arguments have been presented on both sides, and the case now stands for final hearing and determination.

The popular idea of a patent for an invention is, that like a patent for land, it is a grant by the government of the United States to the patentee of some valuable thing possessed by the public, and which, but for such grant, would remain for the free and common use of all. There could not be a greater mistake than this as to the nature and effect of a patent for an invention. A patent to an inventor is nothing more or less than an agreement on behalf of government with the inventor, that, in consideration of his making known fully, and putting into use his invention, for the benefit of the public after the expiration of the patent, he shall, for and during the term of the patent, enjoy the exclusive use of his invention. And the patent law holds out, as a further inducement to invention, that if a diligent inventor should not be adequately remunerated for his time, ingenuity and expense in originating, patenting and introducing his invention into use, then he shall be permitted to have the exclusive use of his own invention an additional seven years, or twenty-one years in all. History shows the natural rapacity and selfishness of all civilized people to have been so great that, without an agreement by the government, enforced by their judicial tribunals, they could not be restrained from seizing and appropriating to their own use any invention of utility as soon as disclosed by its inventor. This necessarily discourages invention by taking away all hope of honor or reward, the chief incentives for men of genius to devote their time, their money, and their talents, to the improvement of the useful arts. But the best interests of society, the advancement of civilization itself, have always required the increase and diffusion of inventions, by which the necessity of animal and manual labor should be diminished, and the comforts of life increased, and rendered more accessible to all classes; and, as these things could only be accomplished by the encouragement of invention, all enlightened communities have enacted laws, by which their governments are required to undertake, by an instrument in writing called Letters Patent, that, if any person would make known and put into use his invention, the people should not, without his consent, take it away from him until the end of a specified term of years. In this, as in most countries, the term is fourteen years, at the least, and it is extended to twenty-one years if, from wrongful infringement, or for any cause other than his own neglect or fault, the patentee should fail, during fourteen years, to derive from his patent adequate remuneration for his invention, regard being had to its ingenuity, and to the time and expense bestowed upon originating and introducing it into use.

The laws of this country for the encouragement of useful arts, by the protection of inventors in the exclusive use, for a limited time, of their own invention, provide that, before the fourteen years for which patents are, in the first place, granted, shall have expired, the patentee may appear before the Commissioner of Patents, acting as a judicial officer, and show that, without fault or neglect on his part, he had not enjoyed the fourteen years' exclusive use of his invention which the patent agreed to give him, or that, having the exclusive use, and being diligent, still, he has failed to receive adequate compensation. The law further provides, that the people may appear in any case and show that they have fulfilled all the convenants of the agreement entered into by the government in their behalf, as set forth in the patent, and that no ground exists for an extension.

In the present case, the testimony establishes the following facts, viz:—

First, That the improvements claimed in the several patents were new and patentable when the said original patent was granted.

Second, That the said improvements have been of great utility and value to the public; that Cyrus H. McCormick, by the introduction of these improvements in the reaping machine into general use, has been a great public benefactor; and that their introduction by him marked an era in the progress of agriculture, at which the necessity for manual labor in the production of grain was greatly diminished, by transferring the most toilsome portion of such labor from men to horses and reaping machines.

Third, That the patentee has used great diligence and perseverance in bringing his improvements into general use.

Fourth, That the patentee has not enjoyed the exclusive use of his improvements for the fourteen years which, by the patent, the government granted to him as an absolute right. On the contrary, infringers have seized these improvements, and without compensation to the patentee, have applied them to very extensive and general use.

Fifth, That those who have opposed the extension admit the value and importance of the patentee's improvements to be such that no practically good and useful reaping machine can be made without them.

Sixth, That the patentee's efforts, by litigation, to restrain infringement of his rights, have heretofore been unavailing, and that the expenses of the patents exceed the sums received as license fees and by way of damages.

I have thus stated what the testimony establishes in behalf of the patentee, sustaining, in my opinion, all the requirements of the law for an extension of his patents, except one most important and essential requirement, and that is, a want of reasonable "remuneration for his time and expense in originating and introducing into use his invention." I will very briefly refer to this feature of his claim for an extension of his patent. In his statement of receipts and expenditures, he states that he has received on account of his manufacturing business:—

For net proceeds of sales of machines in cash	$2,932,585 94
For net proceeds of sales in notes	812,696 13
For net proceeds of sales in book accounts	43,939 31
For interest received on promissory notes	63,266 54
For net proceeds of sales of parts of machines for repairs	71,312 68
For value of machines on hand unsold	57,655 00
	$3,981,455 60

That he has expended on account of his manufacturing business:—

For materials and mechanical labor	$1,333,427 77
For miscellaneous expenses, including salaries, advertising, traveling expenses &c	652,913 66
For commissions for selling machines	370,331 00
For rent of shops, machinery, wharves, wear and tear of machinery, &c	184,000 00
For insurance	31,531 95
	$2,572,204 38
Excesss of receipts of manufacturing business over expenditures, being a profit of about 36 per cent	$1,409,251 22

The applicant claims that the above sum amounts to no more than a reasonable manufacturer's profit, as the proofs show that the average profit received by other manufacturers, over and above the patent fees, is 40 per cent, and that no part of this profit should, therefore, be charged to the invention. He also claims that he should be allowed, for expenses of originating and patenting his invention, the sum of $18,000 and for costs of litigation the sum of $31,750; and that these allowances show that he has not been adequately remunerated for his time, expense, and ingenuity by profits arising from the invention and justly chargeable to this patent. Moreover, that any profits he has made should be divided between his patents of 1845 and 1847 and several subsequent patents. But the patentee's statement shows that the sum of $22,325, not included in the foregoing schedule of receipts, has been received for license fees and damages recovered against infringers. There is also to be added the profits accruing for the year 1861, which may amount to a large sum.

It is but just and proper that the patentee's outstanding claims for patent fees should be added to his schedule of receipts. There is now due him, from all manufacturers who have without license used his invention since its reissue, a patent fee for such use, which there appears no reason why he may not collect, and which, in the aggregate, must amount to a large sum, and would swell his remuneration to such an amount that I am forced to believe that in any event a reasonable remuneration will be received by the patentee: wherefore I am of opinion, having due regard to the great interest the public have in the free use of these inventions, that the patents in question ought not to be extended.

In disposing of this case I cannot omit to notice a letter which has been put in evidence, purporting to be signed by Lee & Fisher, who appear as attorneys, opposing the extensions, and which letter is proven to be in the handwriting of Geo. M. Lee. This letter was addressed to certain manufacturers of reaping machines, urging them to advance money to Lee & Fisher, for the purpose of defeating McCormick's application, and giving strong assurances that, if sufficient money were advanced to them by manufacturers, McCormick would be defeated in the Patent Office. Proceedings of this nature cannot be too strongly reprobated, because they serve to levy black mail upon the public by hungry lawyers, they raise dangerous combinations and conspiracies against patentees and tend to destroy public confidence in the honest and faithful administration of the Patent Office. The fact that such proceedings have been resorted to against McCormick has had no prejudicial influence upon nor changed the determination in his case. I hope that such means will never again be resorted to for influencing the actions of this office, and that in future manufacturers will not suffer themselves to be victimized by such means.

Cyrus H. McCormick is an inventor whose fame, while he is yet living, has spread throughout the world. His genius has done honor to his own country, and has been the admiration of foreign nations, and he will live in the grateful recollection of mankind as long as the reaping machine is employed in gathering the harvest.

But, upon the ground that the patentee has already received, and may, by the diligent assertion of his rights in court against infringers, recover an adequate remuneration for the inventions claimed in his said ten patents, I am constrained to refuse to extend the said patents, and I accordingly order that they be not extended.

D. P. HOLLOWAY.

UNITED STATES PATENT OFFICE,
Washington City, D. C., October 20, 1861.

TO CLEAN PAINT.—Smear a piece of flannel in common whiting, mixed to the consistency of common paste, in warm water. Rub the surface to be cleaned quite briskly, and wash off with pure cold water. Grease spots will, in this way, be almost instantly removed, as well as other filth, and the paint will retain its brilliancy and beauty unimpaired.

Paris---Its Government and Population.

The amount derived, this year, in Paris, France, from direct taxation is, in round numbers, twenty-nine millions of francs, of which nine millions are from land and house taxes, five millions from personal and furniture taxes, three and a half millions tax on doors and windows, and eleven and a half millions shop licenses. The total receipts and expenditures of the city are estimated at 172,075,597 francs. The ordinary receipts are 105 millions, and the extra receipts are 67 millions. Of the ordinary revenue, the following are the most important, items:—71½ millions from the municipal customs (food, wines, &c., pay heavy duties on entering the city gates), donations and legacies for various purposes, 9 millions; market rents, 6½ millions; water rents, 3½ millions; licenses for hawking in the streets, 2½ millions; sales of cemetery lots, 1,350,000 francs.

Among the principal items of the ordinary disbursements are 12 millions annual interest on the municipal debts, 12 millions for keeping the streets in order, 12 millions for the police; public charities and hospitals, 11 millions; collection of customs, 7 millions; National Guard, Paris Guard (military police), 3 millions; primary education, 2½ millions; public gardens and promenades, 2 millions; sewers, 2 millions, &c. The public fetes and ceremonies are this year to cost 771,000 francs, among which it is gratifying to notice the appropriation of 120,000 francs to be distributed among the poor.

It appears from the prefectoral report from 1852 to January 1861, 44,549 new buildings were erected. The number of demolitions was 9,000, an excess of 35,549 in favor of the new constructions. At the end of December last, Paris and the annexed suburbs contained 582,242 lodgings, capable of accommodating, at a calculation of 3 persons to each family, 1,746,726 tenants.

The Iron Testing at St. Louis.

We are informed by Mr. D. A. Hopkins, of Brooklyn, who witnessed the experiments described in our last number, for testing the iron plates of our Mississippi gunboats, that the account, from its incompleteness, was calculated to mislead. The missile fired from the Parrott gun was a shell; solid shot being fired only from a 6-pounder field piece. For the latter the Hotchkiss projectile was used, and, as this is made in three pieces its power of penetration is probably less than that of a solid shot cast in one piece; the leaden band acting as cushion to the cup in the rear.

Mr. Hopkins mentions one very curious phenomenon that he witnessed in these experiments. One of the Parrott projectiles proceeded a considerable distance in the usual curved trajectory, and, while in its descent, suddenly, without striking the ground, turned its course upward, and went on some two miles before it came to the earth.

What the "Louisville Journal" Says.

It says that:—

We do not believe that even in this age of cheap publications any work can be more reasonable than the terms of the SCIENTIFIC AMERICAN at $2 per annum, with twenty-five per cent discount for clubs of ten. It forms a yearly volume of 832 pages quarto, with an immense number of original engravings of patented machines, valuable inventions, and objects of scientific interest. There is not an industrial persuit which does not receive a share of its attention. It contains official lists of patent claims, important statistics, practical recipes for useful domestic purposes, and has long stood, both in this country and Europe, as the highest authority in the mechanic arts and sciences. There is no publication more valuable to the farmer, the miller, the engineer, the iron founder, the mechanic, or the manufacturer. We have never opened a number without learning something we never knew before, and obtaining valuable information for the benefit of our readers. The publishers, Messrs. Munn & Co., of 37 Park-row, New York, have deserved the success which they have achieved. No one should visit that city without calling at their palatial establishment, which is a museum of inventive genius, collected from the entire world. If any of our friends away off in the country do not know this work, and will take our advice, they will mail $2 and become subscribers immediately, or by applying to the publishers they can obtain a specimen copy gratis, which will be sure to confirm the truth of our recommendation.

THE Third Annual San Francisco Directory shows the population of that city to be 78,083, of whom 49,343 are white males, 23,985 are white females, with 3,150 Chinese, and 1,605 colored.

ONE million feet of oak timber, for the manufacture of gun carriages, have been shipped east from Toledo, Ohio.

© 1861 SCIENTIFIC AMERICAN, INC.

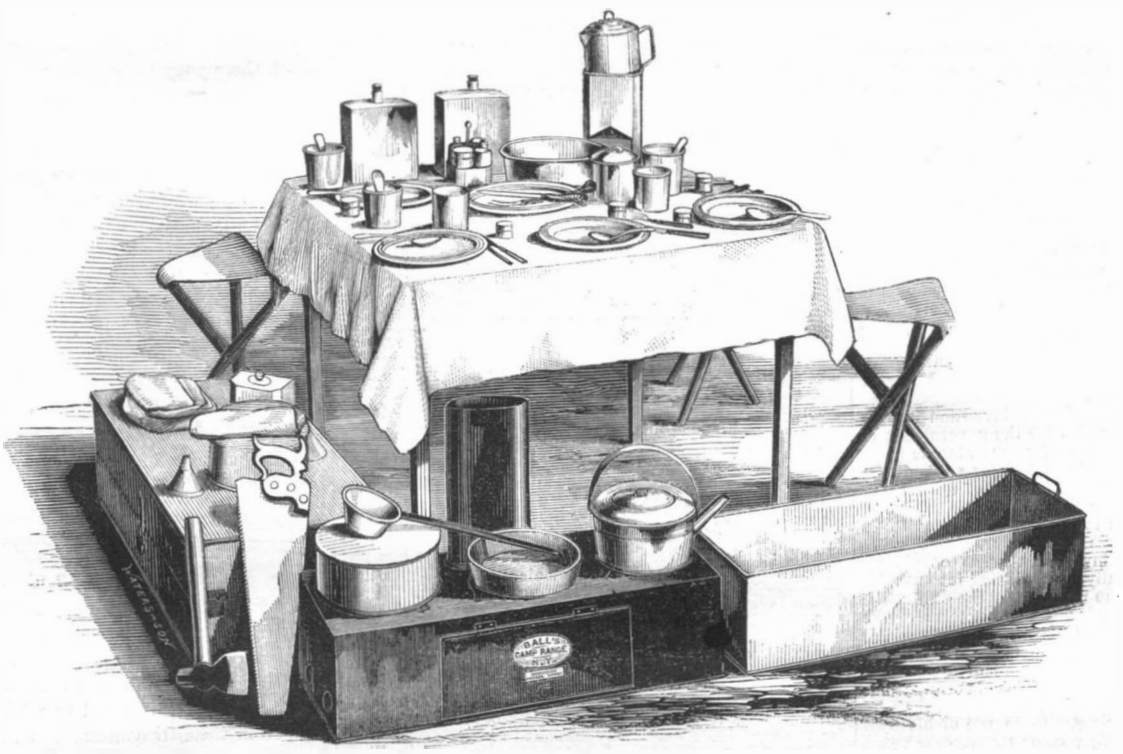
Improved Camp Chest and Cooking Range.

The combined camp chest, table and cooking range here illustrated, was invented by Horace W. Ball, of this city. We have examined it, and consider it a remarkably ingenious and convenient arrangement. The table is entirely detached from the chest, and while it folds into a very small space, is peculiarly rigid and strong when put together. The articles seem to be all of excellent quality and calculated to prove serviceable in actual use; the reputation of the eminent firm who offer the chest for sale being a guarantee for fidelity in this respect.

The great features of this combination camp chest and cooking range are: First, The table, with legs detached, folds and is made to fit in the lid of the chest, occupying a depth of two inches only, and yet is firm and immovable when placed. Second, The range is constructed for boiling, frying and stewing at the same time. The capacity of the boiler is 10 gallons; when not in use, the range, with the top reversed—being made equal to the dimensions of the chest—can be placed inside, and the interior affords space for packing the utensils, precisely as if it were a tin lining for the case. The camp chest is a strong box of black walnut with padlock; dimensions, 15 inches wide; 12 inches high; and 34 inches long. It contains all necessary culinary utensils, besides 3 camp stools and a hatchet and saw.

A patent for the portable camp range was granted through the Scientific American Patent Agency, and application has been made for a patent on the table and chest. The chest, with its contents complete, is manufactured and sold by Ball, Black & Co., 565 Broadway, New York, and further information in relation to the matter may be obtained by addressing the inventor, Horace W. Ball, at the same place.

Messrs. Ball, Black & Co., have completed the manufacture of a magnificent camp chest for Major Gen. Wool. It contains complete sets of breakfast, dinner and supper service, liquor flasks, tea kettles, stove and boiler, canteens, hatchet, twelve camp stools, wash-bowl and a complete set of cooking utensils.

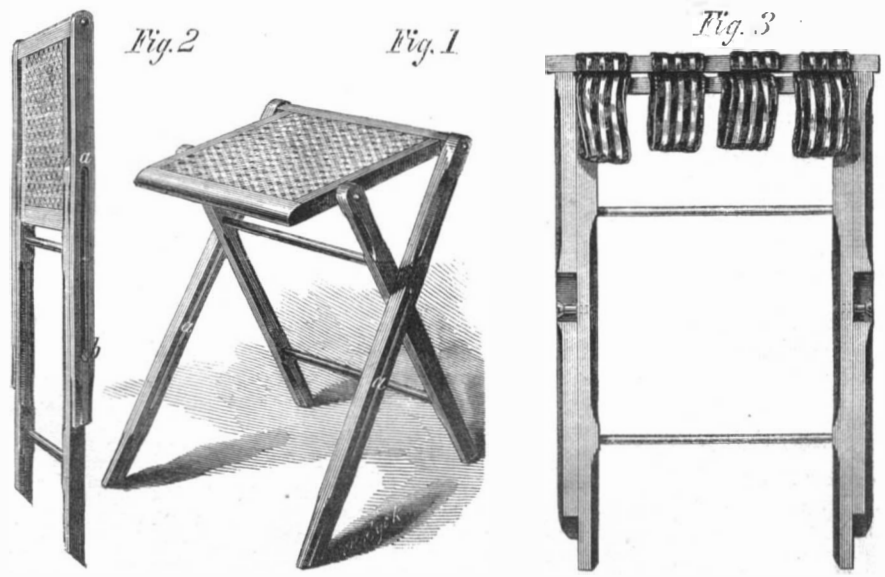


BALL'S COMBINED ARMY CAMP CHEST AND STOVE.

Improved Camp Stool.

The accompanying engravings illustrate a very ingenious improvement in camp stools. From the form into which it folds it is peculiarly adapted for packing in chests or trunks for army purposes, or for traveling. The legs are framed together in two pairs or leaves, each of which is hinged to the seat, as shown in Fig. 1. In the legs of one leaf are long slots, *a a*, through which stout screws, *b b*, are passed into the legs of the other leaf; connecting the two leaves together by a hinged joint. As the stool is folded up, the screw slides down the slot, permitting the parts to be brought into a flat plate, as shown in Fig. 2.

Fig. 3 represents a modification of the stool with cloth bands for the seat in place of the cane bottom



ASHOLD'S FOLDING CAMP STOOL.

represented in Figs. 1 and 2; the construction otherwise being essentially the same.

A patent for this invention was granted through the Scientific American Patent Agency, Sept. 17, 1861. Information concerning the purchase of rights or stools should be addressed to A. & A. C. Ashold, Garrettsville, Ohio.

DE BRAME'S SKELETON CANNON—SUCCESSFUL EXPERIMENT.

On Saturday, the 26th ult., public notice and invitation were given to witness experiments with the skeleton revolving rifled cannon of Mr. J. A. De Brame, illustrated on page 385 of the last volume of the Scientific American. The place chosen for the trial was the flat shore on South Bay, directly below East New York, Long Island. The day was unfavorable on account of frequent showers, and a large concourse of spectators expected from the city were thus prevented from attending. Nevertheless, not to disappoint us entirely in the object of our visit, the gun was brought out during a fair interval in the afternoon, and seven rounds were fired in rapid succession at an elevation of 2° 30′. The target was 15 by 20 feet; the distance, as near as we could measure by pacing, was 1,300 yards—some said it was 1,500 yards. Of the seven shot fired, six struck the target. One was very nearly a center shot; two were richochet; the seventh struck near the mark. Several military officers from the encampment at East New York were present, and all pronounced the practice excellent, considering the circumstances under which the shooting was conducted.

With respect to the rapidity of the firing, all present were astonished. The gun was charged much faster than the time of burning required for the igniting fuses. While down examining the target, one round at 9° elevation was fired by request over our heads, for the purpose of obtaining some idea of the range. This shot passed out to a distance of several miles in the bay. The shot were lead cones of 4 lbs. weight each, and the charge of the powder was four ounces, which was contained in a pasteboard cartridge (bullet and charge in one case), very convenient for loading.

The cannon was a 4-pounder, mounted upon a common 6-pounder carriage. This gun is composed of two principal parts; one a large bronze revolving charge cylinder having six chambers; the other, a fixed steel barrel. The chambers are charged from the back end, and each is successively rotated and brought into line with the steel barrel in front, and discharged with a fuse thrust into the priming opening directly behind. A screw lever on the bolster of the gun closes the breech behind with half a turn, and a key is inserted into a hole in the periphery of the cylinder to hold it in position when firing. The charge cylinder is thus composed of a single piece which is not liable to get out of order. This cylinder is 9 calibers in length; the six chambers extend through its whole length, and are open behind for charging. The caliber is $2\frac{12}{100}$ ths inches; the length of the fixed steel barrel is 2 feet 8 inches, 4 inches only of which are perfectly close; the rest of its length is a skeleton barrel having longitudinal slits between the ribs. The close barrel of this gun is 14 calibers in length; common field guns have close barrels 7 and 18 calibers long. It is claimed that in 14 calibers' length of close barrel the force of the powder is completely expended upon the shot, and beyond this the length of barrel should only have the smallest amount of frictional surface possible; hence the open spaces in the barrel of this cannon. The increased length of barrel beyond 14 calibers is for guiding the shot, thus securing greater accuracy in firing. A considerable portion of the residue of the powder is driven out through the open spaces of the barrel; it therefore does not foul readily, and it seldom requires sponging; it never becomes overheated.

This piece of ordnance was constructed for the patentee by A. & F. Brown (who conducted the firing), corner of Hester and Elizabeth streets, this city, and it is certainly a very ingenious, and, we should presume, will prove a very effective war engine.

The catalogue of the library of the British Museum fills 300 volumes.

© 1861 SCIENTIFIC AMERICAN, INC.

Scientific American

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY
At No. 37 Park-row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Two Dollars per annum.—One Dollar in advance, and the remainder in six months.
Single copies of the paper are on sale at the office of publication, and at all the periodical stores in the United States and Canada.
Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.
☞ See Prospectus on last page. No traveling agents employed.

VOL. V. NO. 19.....[NEW SERIES.]....*Seventeenth Year.*

NEW YORK, SATURDAY, NOVEMBER 9, 1861.

FIFTEEN THOUSAND PATENTS SECURED THROUGH OUR AGENCY.

The publishers of this paper have been engaged in procuring patents for the past sixteen years, during which time they have acted as Attorneys for more than FIFTEEN THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

Pamphlets of instructions as to the best mode of obtaining patents in this and all foreign countries are furnished free on application.

For further particulars as to what can be done for inventors at this office, see advertisement on another page, or address MUNN & Co.,

No. 37 Park-row, New York.

COMPLETION OF THE PACIFIC TELEGRAPH.

A great work is accomplished. The Pacific shore of the country is in instantaneous communication with the Atlantic. Though amid the excitement of war no noisy demonstrations have marked the successful termination of this great enterprise, it is recognized as an event of the very highest importance. Above its inestimable value in transmitting public intelligence and facilitating the operations of commerce, above even its higher uses in communicating the knowledge of deaths and other social events to widely separated families, must be its influence on the destinies of the nation. It is an intellectual nerve stretching across the continent, and constituting the strongest of all bands to bind the extreme East to the furthest West. "All quarrels," says Carlyle, "are misunderstandings," and when the thoughts of people can be instantly flashed from one to another, the danger of misunderstanding is infinitely lessened.

Even the importance of this work, immeasurable as it is, is surpassed by its high significance. It is an additional and a striking proof of the resources and energy of a free and educated people, and it shows that great industrial enterprises may be carried steadily through in spite of the war. None of us who have not crossed the continent can form any idea of the immense distance of barren plain and mountain mass which lies between the confines of Missouri and the rocky coast of California. Over this distance, upon its row of posts, winding its way through the valleys, and up the sides of the mountains, and stretching across mile after mile of sage-bush plain, is drawn the slender wire that forms the road along which ideas take their flight of inconceivable swiftness. It is the last and the greatest of all the conquests of man over the forces of nature.

Among the first dispatches sent over the Pacific telegraph was the following to the proprietors of this paper.

SACRAMENTO, Oct., 25.

MESSRS. MUNN & Co.:—
CONGRATULATIONS OF CALIFORNIA MECHANICS!
"Long Live the Scientific American!"
THOS. HANSBROW.

This dispatch was received in New York at 15 minutes past 2 o'clock in the morning of October 26th, and this would have been the date of its receipt had it been sent from Sacramento at 4 minutes past 11 on the evening of October 25th, and come through instantaneously. The longitude of New York is 74° 0′ 3″ west, and that of Sacramento is 121° 40′ 5″, making a difference of 47°, 40′ 2″, and as the earth turns 15° in an hour, or 1° in 4 minutes, the difference in time is 3 hours, 10 minutes and 40 seconds. At the instant when it was 11 o'clock and 4 minutes at Sacramento, New York city had been turned forward 2 hours and 15 minutes into the next day. Had the dispatch been sent through instantaneously from New York at 15 minutes past 2 o'clock on the morning of the 26th, it would have arrived at Sacramento at 4 minutes past 11 o'clock on the evening of the 25th. In other words, it would have reached its destination the day before it was sent.

We recently gave an account of the visit to this country of an agent of the Russian government, who came for the purpose of procuring information preparatory to the construction of a telegraph from Russia across Behring's straits to California. This work will doubtless be prosecuted with vigor, and it is quite probable that before the Atlantic telegraph is in successful operation, we shall receive our news from England by the way of Siberia.

THE CONDITION OF OUR SOLDIERS.

From gentlemen of the Sanitary Commission we learn that there is great difference in the comfort and health of the different regiments of our army. The camp of the Second Rhode Island Regiment is kept scrupulously clean, the tents are kept warm and dry by the admirable arrangement described in our last number, and the food of the soldiers is cooked in a cleanly and wholesome manner. Indeed, some of the men have been making money by cooking for other regiments; exchanging a pound of bread for a pound of flour, and clearing for themselves a quantity of flour equal in weight to the water left in the bread. The health of this regiment is excellent, the men being almost wholly exempt from the low fevers which prevail in camps similarly situated in the immediate neighborhood. As these advantages are due in a great measure to the intelligence and energy of the colonel, it is in the power of the other colonels to secure the same advantages for their respective regiments. All that is needed is to see that the rules for temperance, cleanliness and discipline are rigidly enforced.

There is no one element of more importance to the efficiency of an army than its sanitary condition. When a soldier is sick he can neither march nor fight, and he must, furthermore, be taken care of by those that are well. As a mere matter of economy in dollars and cents, there is no effort more valuable than that which is directed to the health of the troops. It is estimated that each soldier costs the government $1,000 a year, and of course on all that are ill not only is this expense lost, but an additional cost in taking care of them. If any officer desires to have his troops in an efficient condition, so that they will carry him with credit through the war, let him devote himself with constant energy to their comfort, cleanliness and general physical wellbeing.

Commissioners acting under government sanction, have been devoting special attention to the condition of the hospitals and the comfort of our sick and wounded soldiers, but have no appropriations from Congress to aid them in discharging their duties. They award the highest praise to General McClellan, saying that he exerts all the energy which it is possible for one man to possess in promoting the efficiency and wellbeing of the great army under his command; but there are numerous little luxuries that many of our soldiers would receive if they were ill at home which are not included in army supplies. There are now men in the military hospitals at Washington, in a condition in which a little pure wine would be very conducive to their recovery, but they are unable to procure it for want of means, and are therefore forced to go without it. There is one man with a fractured thigh lying on a hard mattress; an india-rubber bag filled with water—a water mattress, as it is called—placed under his hip would give him unspeakable relief; but this hospital luxury is not embraced in the regulation list of supplies, and the man must bear his suffering as he may.

There are in the community a great many persons who are grateful for the blessings that have fallen to their lot, and are very ready to share them with their less favored fellow mortals, but they are wisely and justly suspicious of the every-day calls upon their charity by the beggars in our streets. It is the opinion of all who have investigated the subject of pauperism that no benevolent person ought to give money to beggars. The concurrent testimony from all sources and in all places is overwhelming and conclusive in the proof that this practice causes more suffering from poverty than it relieves. We have heard a clergyman, who was employed for several years in the Ministry to the Poor in New York, make the assertion that, with money in his pocket, furnished by men of wealth to be given to the poor, he has ranged the narrow alleys and mounted into the squalid garrets of this great city, with its 30,000 paupers, without being able to find a case in which he was not satisfied that the giving of alms would do more hurt than good; and he was forced to carry back the money to its owners.

The statement of these facts has caused embarrassment in the minds of our wealthy citizens in regard to the proper bestowal of their charities. Now, however, they have an opportunity in which there can be no doubt. They may open their purse strings to the widest without the slightest fear that the good which they do will be counterbalanced by a greater evil. The brave men who have been literally pouring out their blood for the salvation of the nation are suffering for want of the comforts and conveniences of the sick chamber. We have no doubt that the dissemination of a knowledge of this fact is all that is required to call forth ample means to supply the want. Let each man's contribution in this case be a stimulus to another important duty; that is, the refusal of alms to street beggars during the remainder of his life.

THE COMMISSIONER'S DECISION IN McCORMICK'S EXTENSION CASE.

We publish at length on another page the decision of Commissioner Holloway denying the application of C. H. McCormick for an extension of his several patents for improvements in reaping machines. The case is undoubtedly one of the most important that has ever been brought before the Patent Office, and as such it merits something more than a mere passing notice. The inventor, Cyrus H. McCormick, is a native of Rockbridge county, Va., but has resided for many years past in the flourishing city of Chicago, Ill. He early devoted his attention to the discovery of an invention for reaping grain, and secured his first patent June 21, 1834. As early, however, as 1831, he had put into successful operation a reaping machine which was afterward the subject of his first patent. Subsequently—Jan. 31, 1845—he secured his first patent for a machine for cutting grass, and since that time he has, by unwearied and courageous devotion to his business, amid difficulties and disappointments such as would have crushed ordinary men, succeeded in making his invention a complete success, and establishing himself in the lucrative business of manufacturing his own machines. His success as an eminent inventor has been acknowledged not only at home, but also in all European countries, and substantial marks of favor have been awarded to him for his invention.

The Commissioner says in his report that the testimony submitted to him established the fact that no practically good and useful reaping machine could be made without infringing upon McCormick's patents. This is the key that unlocks at once to public view the exceeding great value of his inventions; and, when we reflect upon their importance to the great agricultural interests of the whole world, it will not be far out of the way to assert that *the inventions patented by McCormick equal, if they do not exceed, in value and importance any others ever patented in this country*—casting the sewing machine, india rubber, &c., entirely in the shade. This assertion is further proved by the fact that infringers have followed McCormick's track with unwonted industry and vigilance, and have been confronted by him with a determination to turn them back, which, as a general thing, he has succeeded in doing.

According to the figures produced in the case under consideration, McCormick does not appear to have suffered very much pecuniarily on account of his genius.

It has been a matter of public notoriety that in some way he has accumulated a large fortune and the

© 1861 SCIENTIFIC AMERICAN, INC.

evidence fully sustains this impression. He appears to have been one of the most fortunate out of all the large number of patentees who have realized competence from their inventions. We are by no means sorry to record this instance of rare good fortune. We rejoice that he has met with such superabundant success. Nothing is more gratifying to us than to hear of the success of our inventors. As a class they deserve much more from the community than they receive. Yet we still contend that, as a general rule, quite as many fortunes are made on an average out of patented inventions as are gained from other branches of business, while it is notorious that in many instances inventors have risen to positions of great wealth and influence.

The case under consideration has been acted upon—the Commissioner has rendered his decision—the prayer of the applicant is denied and now the ingenuity, the toil and enterprise of the inventor, so far as the free use of these inventions is concerned, are at the public disposal. All can now use McCormick's reaping machine inventions without let or hindrance, and it matters therefore but little what may be said either in justification or in condemnation of the Commissioner's decision. We propose very briefly to discuss one or two points involved in this decision. Our sympathies naturally incline to the side of the inventor. We rejoice in his success, and throughout our extended career as conductors of the Scientific American we have strenuously defended their rights against willful infringers, and have always contended for a liberal construction of the law in their behalf. We have no sympathy whatever for a willful infringer, and yet we have little patience with patentees who grasp at everything and endeavor to crush out all subsequent improvements, unless they can make them subservient to their own interests. We honor an inventor who, through discouragement and doubt, boldly prosecutes all who dare invade his indefeasible rights, solemnly guaranteed to him by the law. McCormick has not been slow to prosecute infringers. In this he has met with much opposition, and some contumely. It now appears that he was right and his opponents wrong. The Commissioner says "*that the improvements claimed in the several patents were new and patentable when the said original patent was granted*;" therefore, it follows that the patentee was justified in prosecuting all who sought to violate his rights under them. The Commissioner furthermore asserts that *no practically good and useful machine could be made without infringing his patents.* If this opinion is correct it follows that all manufacturers of practically useful reaping machines were infringers, and have only themselves to blame if the patentee sued them for damages done to his rights. It was for them to show that they were free from such a charge, otherwise they must suffer the consequences pointed out in the law.

The Commissioner admits all the strong points of McCormick's testimony, except in regard to what may be considered as just compensation for his invention. The balance sheet shows that the patentee had realized $1,409,251 22 manufacturing profits. The public will at once say: "That is enough; the Commissioner did right in refusing the extension; a man who has made nearly a million and a half out of a patent ought to be satisfied." These are but natural inferences and in some degree they are just, but they do not fully cover the ground in a strictly logical point of view. The question may arise, how much has the inventor received as a patentee apart from his business as a mere manufacturer? How much loss has he sustained in defending and establishing the legality of his patent? And, furthermore, has he enjoyed that protection which it is the presumption of law to afford, viz., a term of fourteen years? It must be admitted by all, we think, that an invention so confessedly important as the one under consideration is clearly proved to be, can hardly yield too great a reward to its inventor. It is worth hundreds of millions to the world, and we contend that in an equitable point of view a very generous share of its value should fall into the lap of its discoverer. Taking, therefore, the fairest possible view of the case, and with all deference to the Commissioner's decision, we do not think McCormick has received a reward for his ingenuity in perfecting and introducing his invention commensurate with its great value to the world, especially when we consider the important fact that a large portion of this reward has grown out of his success as a manufacturer. Another important fact is also established by the evidence, viz., that McCormick's patents have only been established in their legal status since he obtained his re-issues, September 20, 1859. (See Vol. 1, page 229 Scientific American.) This, we admit, is a technical question upon which there is a variety of opinion, but in the strictest sense it cannot be said that McCormick has enjoyed the full, free and uninterrupted use of his invention during a period of fourteen years, as guaranteed by law.

It is evident, however, that in spite of these objections McCormick has achieved great financial success. He has given to the world, it is true, an invention of incalculable value, but during the term of the patent secured to him, he has realized a large fortune from its use by the public. We have no doubt the Commissioner's decision will be generally approved, although we confess that the applicant, according to the Commissioner's own admissions, made out a very strong case, one that would have justified a favorable decision in his behalf.

The Commissioner's decision is commendable for its brevity and general good sense, but we regret to notice in it what strikes us as a very grave error of judgment. We allude to that portion of it referring to the conduct of Messrs. Lee & Fisher, the attorneys who conducted the opposition to the application of McCormick. We have not seen the correspondence to which the Commissioner refers, but basing our opinion of the transaction wholly upon the terms in which he states the case, we cannot but think that the Commissioner, in his extreme tenderness of conscience, has misconceived the intentions of the attorneys in question. We can see no warrant for the assumption that their proceedings indicated anything like an attempt to levy black mail, or that a conspiracy existed against the applicant to deprive him of his just rights before the office. In the ordinary acceptation of the term a conspiracy means a combination of men for an evil purpose. Now we have no idea that the proceedings of Messrs. Lee & Fisher are liable to so grave a construction as the Commissioner puts upon them. We know but little about these parties, but, it appears to us, that they are not obnoxious to charges so grave as are alleged. Our theory of the matter is this, viz: that these attorneys were employed as counsel to oppose the extension of McCormick's patent; they were fully aware that he had the power to sustain his claim before the office by every proper available legal and moral appliance. To sustain the opposition with any chance of success required correspondingly strong measures. These attorneys, therefore, solicited the coöperation of all who felt interested in defeating the prayer of the applicant. To this end they addressed a circular letter to parties known to be opposed to the extension, with a view to consolidate and render available their strength. Counsel must be retained, testimony must be taken, witnesses cross-examined, journeys made, printing done, incidental expenses incurred, such as might discourage one, or even a dozen, opponents to undertake, all requiring a considerable outlay of money. Now it seems to us, therefore, in all charity, that Messrs. Lee & Fisher, in seeking to unite the opposition were doing a strictly professional business. If, in consequence of over zeal, these attorneys have been so unfortunate as to incur the suspicion of the Commissioner of Patents that all was not right, the public should be slow to adopt the inference that they were guilty of attempting to levy black mail, or in organizing a conspiracy to influence either the Hon. Commissioner or any of his subordinates. The public need, however, no assurance that the Commissioner has decided this case according to the clearest convictions of his sworn duty.

PERKINS' STEAM GUN AGAIN.

The New York *Evening Post* states that a pamphlet lately published in London has been received here which contains a description of Perkins' steam gun, and that the inventors (Messrs. Perkins, father and son), offer to make for the United States government a twelve-pounder with the Whitworth rifled barrel and boilor complete, ready for position on a war vessel, and capable of discharging ten balls a minute, at a cost not to exceed five thousand dollars. The *Post* states that the Messrs. Perkins, though residents of London, are natives of Massachusetts. Old Jacob Perkins, the original inventor of the steam gun, was a native of Newburyport, Mass, in which place he was born in 1766; but he is not now in the land of the living, having died in London, July 30, 1849—twelve years ago. Jacob Perkins was the inventor of the nail-cutting machine; he was also the inventor of transferring impressions from hardened steel plates and cylinders to soft steel plates, by pressure. This invention has revolutionized the whole art of bank-note engraving, and it has been universally adopted. He went to London in 1818, where he had at that period a wider scope for his genius, and he resided in that city until his death.

Mr. Perkins, soon after his arrival in London, directed his attention to the subject of steam artillery, and he saw that the first object to be secured in attaining success was a boiler of sufficient strength to withstand great pressures—about 60,000 lbs. on the square inch. He patented such a steam generator, composed of a stack of tubes surrounded with fire, in 1824, and he then applied this boiler to the projecting of bullets by its high pressure steam, and it was called "Perkins's Steam Gun." This is the same steam generator which appears to be described in the pamphlet from which our cotemporary quotes as follows:—

The generator consists of wrought-iron tubes three inches external diameter, and three-eighths of an inch thick, arranged in horizontal layers, between which the flame passes, completely surrounding every tube. The fire-box and flue are encased in sheet iron and bolted firmly together, so as to form one solid fagot of tubes.

The breech of the gun, which is made of gun metal, has a "universal joint" for adjusting the elevation and horizontal movements of the barrel. The steam valve is fitted to the base of the universal joint, and is kept close by the pressure of steam, similar to the discharge of both shot and shell—percussion or fuse—and these are introduced into the breech by means of a conical valve, which acts with great facility in receiving the projectile and transferring it to its proper position to be acted upon by the steam.

The following are the advantages claimed for this steam gun:—

Every shot fired from a 12-pounder steam gun will consume but three ounces of coal and twenty ounces of water—a total of twenty-three ounces, being less than the weight of gunpowder necessary for throwing the same weight of shot the same distance—the range of the two guns being equal. The total amount of coal necessary for a continuous discharge of the 12-pounder steam gun for ten consecutive hours, at the rate of ten shots a minute, will be about half a tun, the cost of which will not exceed three dollars. The gunpowder required for an equal number of shots, at the low estimate of one pound of powder for each charge, would cost, at fifty cents a pound, no less than $3,000.

Our opinions respecting the comparative merits of steam and powder guns were given on page 377 last volume Scientific American, and since that period we have learned nothing to warrant a change of them. If the Messrs. Perkins will construct one of their steam guns and send it to the United States for trial, it will no doubt be purchased by our government if it fulfills all the conditions required and possesses the advantages claimed for it. Powder can be purchased at 13 cents per lb., wholesale—about one-fourth the above cost.

THE NEXT NUMBER.

Our next number will contain engravings and descriptions of the following novel and interesting inventions:—

Lemercier's French Shoe Pegging Machine; a novel device for fastening soles upon shoes by means of screws.

A Pleasure Iceboat; representing a sailing craft on runners, after the model of those so much used on the Hudson river last winter.

Chinese Mode of Warfare; representing three Chinamen discharging a single musket.

The next will be an exceedingly interesting number of the Scientific American.

The subject which occupies by far the most prominent position of any in the world of science at the present time is Bunsen and Kirchoff's discovery of spectral analysis. In the article on another page, entitled "The Spectrum," will be found a comprehensive glance at the whole subject; and the article with the heading, "The Spectroscope in New York," contains an illustrated description of the apparatus employed, as simplified by Dr. Walcott Gibbs, of this city.

The iron columns used in the construction of the fire-proof warehouses in Liverpool are all hollow, and filled in the inside with fire-proof concrete.

© 1861 SCIENTIFIC AMERICAN, INC.

STEAM BATTERING RAMS.

A communication of considerable length on the above named subject, by Charles Ellet, Jr., C. E., has been just published in the *National Intelligencer*, of Washington. It was penned under the idea that the ranting news first received from New Orleans regarding the destruction of the *Vincennes* sloop of war by the secession steam battering ram *Turtle*, was correct. In allusion to this subject Mr. Ellet states that "the people of New Orleans had taken an old steam tugboat and so strengthened her hull that they have been able to run her against a United States steamer of sixteen guns and sinking it." This forms a text for Mr. Ellet to discourse upon the utility and terrific efficiency of steam marine battering rams, formed out of old tugboats and coal scows. He states that in case of a war with any great naval power the affair at the mouth of the Mississippi teaches us that "although modern iron-covered steamers may pass by our forts and batteries with contemptuous defiance and anchor before the wharves of the great commercial cities of the seaboard and take and destroy them with impunity, yet they will not be able to resist the shock of a steamtug, or an old collier fitted up as a battering ram." Mr. Ellet then relates that he published a pamphlet on this subject six years ago, in which he described how steamtugs, and even ferryboats, could be converted into such battering rams and that they would be able to cut through and sink all the war fleets which could be sent into our harbors.

Steam battering rams have been advocated by more than one distinguished engineer. Mr. Jas. Nasmyth, the inventor of the steam hammer, designed one several years ago, and proposed it for the British navy. It was a terrific iron war hippopotamus, with a great shell gun on its bow calculated to blow every vessel which it struck into splinters. The French and British naval authorities have not forgotten Mr. Ellet's pamphlet nor Nasmyth's ram, descriptions of which appeared in all the leading British and American papers. Several of the new French iron-clad steamers and the new English mail-clad frigates are to be furnished with strong auxiliary iron bows for striking vessels and running them down, as recommended by Mr. Ellet.

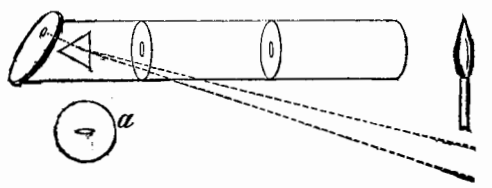
We have no doubt but such war rams as those which Mr. Ellet recommends, would be very effective against slow wooden steam frigates, but they would be utterly worthless against modern iron-clad frigates. The capacity of a steam battering ram to sink other vessels will be in proportion to its mass and the power of its engines. A huge iron steam frigate of 8,000 tuns and 3,000-horse power, like the *Warrior*, would be capable of running down all the little steamtugs, ferryboats and coal scows from New York to Florida, even though they were fitted up for battering rams upon any known principle.

THE WARMEST AND BEST CLOTHING.

Most persons suppose that fabrics made of coarse wool are the warmest and most durable. This is a mistaken idea. Owing to the lower prices of coarse wool, fabrics of this material are usually made heavier than those of fine wool, hence their greater thickness deceive persons respecting their qualities for warmth and wear. There is no heat in the wool itself; its property of what is called "warmth" is due to its non-conducting qualities. If we grasp a bar of iron on a frosty morning, it produces a disagreeable cold sensation because it is a good conductor of heat, and the warmth of the hand is rapidly carried off by the metal. On the other hand, a piece of woolen cloth, especially if it has a long nap upon it, does not feel cold because it is a good non-conductor, and prevents the heat passing rapidly from the hand. Now the warmest fabric for clothing is that which is the best non-conductor; and Count Rumford made a great number of experiments with different materials in order to find out the best. According to his observations, the down of the eider-duck, which the Esquimaux use in their clothing, is unrivaled in this respect; and the finer the fabric of woolen cloth used, the more imperfectly did it conduct the heat from the human body. As fine woolen cloth is superior to that of coarse wool as a non-conductor, it is therefore the best for clothing in keeping the body warm during old weather. We are also positive that cloth made of fine wool equal in thickness to that manufactured from the coarser material will wear much longer. The finest woolen cloth, although dearest at first, is cheapest in the end, because it is more durable and warmer; and, according to Liebig, so much heat saved is so much meat gained. It must not be overlooked, however, that there may be a very great difference between what is called "firm cloth" and cloth made of fine wool. Fine wool is our theme; it feels pleasant and soft to the touch, and it has a rich velvety appearance. There has been a great demand recently for coarse wool to be used in the manufacture of common army and other cloth, but every effort should rather be made to obtain plenty of cheap fine wool, because it is the warmest and best for clothing.

THE SPECTROSCOPE IN NEW YORK.

That latest miracle of science, the spectroscope, the instrument employed in those investigations that have revealed to us the existence of certain substances in the sun, has made its way from Germany to this country and is being manufactured in New York. At the regular monthly meeting of the Photographical Society, on the evening of the first Monday in October, Prof. Joy, of Columbia College, exhibited a spectroscope made in this city under the directions of Dr.



Walcott Gibbs. Prof. Joy also showed a colored engraving of the spectra produced by burning some of the metals, such as potassium, sodium, lithium, &c., as well as that of the two new metals, rubidium and caesium which were discovered by means of this instrument. The Professor then burnt several of these metals in the flame of a Bunsen's burner connected with one of the gas fixtures n the room, and allowed the members present to see the spectra produced, and to compare them with the engravings. The exhibition attracted the most intense interest, and in the discussion that followed, the discovery was universally treated as the great discovery of the age, Prof. Joy himself pronouncing it, "wonderful, wonderful."

On page 20 of our current volume we gave an illustration of the spectroscope employed by Bunsen and Kirchoff in their investigations, but the modifications introduced by Dr. Gibbs make it a far simpler instrument, one that may be constructed by any ingenious mechanic. As many of our readers may like to make a spectroscope for their own use, we present an illustration of the instrument as modified by Dr. Gibbs.

A tube, about an inch and a quarter in diameter and 14 inches in length, has a triangular glass prism secured near one end with its axis horizontal across the tube. The opposite end of the tube is closed, with the exception of a narrow slit which is parallel with the axis of the prism, and the width of which is adjustable, the upper side being bounded by a sliding gate that can be raised and lowered by means of a worm screw. To prevent the spectrum from being distorted or obscured by diffused light, two diaphragms are introduced into the tube with oval slits in their centers as shown, parallel with the axis of the prism. The end of the tube near the prism is closed by a brass cap which is perforated with a small hole at the point where the ray of light coming through the axis of the tube and bent by the prism will strike the cap. By placing the eye at the orifice the spectrum is seen in the direction traversed by the rays of light after leaving the prism, and will appear in the position indicated by the dotted lines. The inner side of the tube, as well as the diaphragms, should be covered with a paint or varnish of a dull black color, to absorb any stray rays of light that may enter.

It is probable that a prism which would answer every purpose might be selected from the ornaments of a chandelier; but if any one wishes a very choice article ground expressly for the purpose, it can be procured of Henry Fitz, telescope maker of this city, for five dollars. The spectroscopes, nicely mounted, are made by Charles Sacher, 151 Fulton street, for twenty-five dollars.

We observe that the lecturers in London use a spectroscope which casts its image on a screen so that the colors and lines may be seen from all parts of the room. This would manifestly be the best form for colleges and schools, and we should think that some of our ingenious mechanics might get up an instrument for private use at a much lower price than twenty-five dollars. When compound microscopes are offered for two and a half dollars, it would seem that a spectroscope might be sold for double the price, at most.

CHEMISTRY OF IRON.

Number II.

OXYGEN AND SULPHUR.

In treating of iron and its compounds there are two substances that will engage so large a share of our attention that it will be well to devote a preliminary article to their examination. These are oxygen and sulphur. Oxygen is the most abundant substance in nature. It forms about one-fourth of the atmosphere, and eight-ninths of all water, and enters into the composition of nearly all rocks and earths. We have already some little balls made to represent its atoms.

Sulphur has never been separated into component parts, and is, therefore, regarded as one of the elements. Its atom is sixteen and a fraction times heavier than the atom of hydrogen, its atomic weight being 16.12. This is just about twice the weight of the oxygen atom, and as the atom of sulphur is only one-third the size of that of oxygen, some material six times as heavy as that employed to represent the oxygen atom will be suitable for those to represent the atoms of sulphur. Let us have then a number of balls of clay one-sixth the size of the pith balls which represent atoms of hydrogen. These balls we will mark with the initial of sulphur, S; and it will be understood that when S is employed in chemical formulæ it means one atom of sulphur, S_2 means two atoms, and so on. We will make some little holes through the balls so that we can tie them together.

Now if we tie three atoms of oxygen to one atom of sulphur (SO_3) we shall represent the combination of the two substances that forms sulphuric acid, or oil of vitriol. The four atoms thus combined form one atom of sulphuric acid, represented in chemical formulæ by SO_3. Whenever a chemist sees these characters in this order, SO_3, he understands it to mean oil of vitriol.

When sulphur is burned in the air each atom of sulphur combines, not with three atoms of oxygen to form sulphuric acid, but with two atoms to form sulphurous acid (SO_2) a substance with very different properties. The boiling point of sulphurous acid is 14° above zero, so that at ordinary temperatures it is a gas.

The thread by which we bind the balls together will represent the mysterious force of chemical affinity; and we will use a very strong thread to bind the two oxygen balls to the one of sulphur, as the affinity of oxygen for sulphur is very strong. When they are united in this particular proportion it is very difficult to separate them; in other words, sulphurous acid is a very permanent compound. The affinity of sulphurous acid for oxygen is also quite strong, and in attaching the third oxygen ball to make up the atom of sulphuric acid, we must use pretty strong thread, though less strong than that employed to form the atom of sulphurous acid.

Sulphuric acid is one of the most common and important substances used in the arts. Berzelius says that the quantity of sulphuric acid consumed by a nation is a pretty good measure of its civilization. As the combination of the elements to form this substance is a most admirable illustration of the whole law of chemical combination, our young friend will find no more profitable lesson in his chemical studies than the construction of the representation of its atom as we have directed. As the atom of sulphuric acid is composed of 3 atoms of oxygen, weighing each —omitting the fractions—8 times as much as an atom of hydrogen, and 1 atom of sulphur, weighing 16 times as much as an atom of hydrogen, the atom of sulphuric acid weighs 40 times as much as an atom of hydrogen. Its atomic weight, including the fractions, is 40.199.

It is said that France will require eighty millions and Great Britain sixty-four millions bushels of grain, to make up the deficiency in their crops this year.

© 1861 SCIENTIFIC AMERICAN, INC.

NOTES ON FOREIGN INVENTIONS.

Permanent Analine Colors.—R. H. Gratrix, England, has applied for a patent for rendering printed and dyed aniline colors permanent. The cloth is first prepared with stannate of soda, then passed through a thickened solution of tannin, after which it is either printed or dyed with the aniline color (magenta, solferino, mauve, &c.), then subjected to the action of steam. Aniline colors have not yet been rendered permanent, so far as it relates to the action of sunlight upon them. They change rapidly upon solar influence, but can be washed without fading.

Rolling Gun Barrels.—An improvement in making twisted gun barrels has been patented by W. Perry, of England. It consists in rolling the skelp of iron in such a manner that when twisted into a helix for a barrel, it forms what is called a mould, with the edges overlapping, instead of abutting one against the other, as in the old method of rolling. During the subsequent process of rolling to weld and elongate the metal of a barrel the action tends to press the joints together, whereas the old method of elongating the barrel tended to open the welded joints.

Silvering Glass.—J. Cimeg, patentee. A solution of ammonia, nitrate of silver and tartrate of soda is applied to the surface of the glass, when the metal is soon deposited in a bright film at the ordinary temperature of the atmosphere. This is considered to be, perhaps, the most simple method of depositing silver on glass yet discovered. Other modes require the application of high heat to produce the deposition of the metal from a nitrate solution.

Preventing Corrosion in Boiler Tubes.—The necks of iron tubes in steam boilers are most liable to corrosion and consequent leakage. To prevent this evil A. Wall, of London, places on the ends of boiler tubes, where the flame enters them, short movable tubes, which act as protectors to the main tubes. He also coats these short tubes with an anti-corrosive metal, such as silver or gold—a rather expensive application, we think.

Improved Nautical Compass.—G. L. Ripamonti, of Bordeaux, France, has applied for a patent for a mode of obviating local attraction from affecting the action of the compass needle in iron vessels. He places under the card of the needle a number of magnetized needles, laid parallel to each other, with their points due north and south, and corrects the compass by these. This is apparently similar to Kline's American mode of constructing compasses.

Recording Atmospheric Phenomena.—A meteorological instrument has been patented by A. J. Joyce, England, for indicating various atmospheric phenomena taking place in any locality. For this purpose, a plate, representing by outline the divisions and other geographical features of a country, is perforated with holes for the reception of movable types, adapted to indicate, by arrows, numerals; cyphers and other marks, the force and direction of the wind, the state of the temperature, fall of the barometer, &c. Impressions are taken at regular intervals by printing from the plate, so that a simple and permanently printed meteorological record is thus kept. As the types and signs are movable, they can be altered and readjusted at any hour to record the occurring atmospheric phenomena.

Dressing Flax.—In the dressing of flax and other similar fibers, it has been customary to employ drums armed with teeth set at right angles to the surface of each revolving drum. A patent has been obtained by A. Smith, London, for setting the teeth on such drums pointing in a reverse direction to that in which the cylinder is driven. By thus setting the teeth of such drums at a reverse angle to those in common use, the fibers, it is stated, are not so much injured, therefore less tow is made and more good fiber secured. In combination with the drum, Mr. Smith uses an apron, hinged at the bottom end of the case. This apron is hollowed out on the inside and armed with brushes, so that the attendant can feed the flax in a superior manner to the action of the revolving machine.

Army Mortars and Carriages.—A. Krupp, the distinguished Prussian manufacturer of steel and cannon, has applied for an English patent for constructing mortars composed of cast steel hammered into form and afterward bored. He constructs his mortars without trunnions, by forming the bed of each carriage in such a manner that the mortar can be ranged at different angles upon a ball and socket joint secured in the bed plate.

Treating Flax and Hemp.—The scarcity of cotton in England has aroused inventors in that country (and it should do so in America) to make improvements in treating the common coarse flax and various grasses, to use them as cheap substitutes for cotton. T. Robb has lately secured a patent for an improved mode of softening the fibers of hemp and flax, prior to their being hackled. He employs a circular trough in which the hemp is laid, and a series of heavy rollers are made to travel over the flax or hemp until it is thoroughly softened. The bottom of the trough is fluted, and the rollers are contained in a loose journal box, and the gearing for driving them is so adjusted as to give them a slight slipping motion, which causes a gentle rubbing action upon the fibers that is found to be very beneficial in softening them for subsequent operations.

New French Military Drill.—Walking in water.—Experiments at Vincennes, France, have lately been tried, it is stated, with perfect success, by which a foot soldier, in heavy marching order, is enabled to walk on the water without sinking. The equipment consists of a pair of double india rubber boots and trowsers, all in one piece, which are partially filled with air to a little below the waistband, and weighted at the feet. With such trowsers a detachment of soldiers have frequently crossed the lake at Vincennes, where the water is about fifteen feet deep, firing their muskets and loading as they moved along. The men sink about two feet, but the water does not reach to the top of their thighs, and they do not appear to have any difficulty in maintaining their balance and moving along pretty fast. It is expected that a portion of the French army will soon be equipped with such walk-in-the-water gear. Water boots have been tried with considerable success by several intrepid Americans, but France is always in advance in applying useful inventions to military purposes.

RECENT AMERICAN INVENTIONS.

Cube Sugar.—In the manufacture of cube sugar from what is known as "refined," or from other granular sugar, much difficulty has been encountered, owing to the want of some practicable method of rendering adhesive the grains of crystals of which the sugar is composed. The object of this invention is to overcome this difficulty, and to this end it consists in exposing the grains or crystals, preparatory to their introduction or while on their way to the molds or cube-forming apparatus, to the action of steam, by which their surfaces are subjected to the necessary degree of heat and moisture to give them the requisite adhesiveness. Gustavus Finken, of Brooklyn, N. Y., is the patentee.

Railroad and Car.—The object of this invention (by Chandler McWayne, of Sacramento, Cal.) is to construct a railroad with a single elevated rail and have a car placed or suspended thereon, arranged and constructed in such a manner that it may be readily balanced on the single rail, however unequally passengers or freight may be disposed in the car, provision being also made for keeping the car in a proper horizontal position while being loaded and unloaded, certain means being also employed for enabling the locomotive and train to pass up heavy grades with facility.

Printing Press.—The object of this invention is to print under-surface *fac similes* clear and bold in impression, and when in colors, entirely accurate and well defined in registration. The invention consists in adopting a method similar to the one employed in the striking of coins and medals, viz., the strict confinement of all the parts when in the act of being printed. To this is added the application first of a set or stated pressure to the plate and paper preparatory to the feed impression, and upon this the application of a secondary pressure, progressive or accumulative in character, with very great momentum, resolving itself at last by reason of its momentum into a blow. The credit of this invention is due to Jabez W. Hayes, of Newark, N. J.

THERE were exported from Belfast, Ireland, last year no less than 65,600,000 yards of linen cloth and 18,200,000 pounds of linen yarn and thread.

NEW YORK MARKETS.

WHOLESALE.

ASHES.—Pot and pearl, per 100 lbs., $5 25 a $5 31.

BARK.—Yellow oak for dying, per ton, $27.

BEESWAX.—Per lb., 33c.

CANDLES.—Sperm and stearic, per lb., 25c. a 38c.

COAL.—Cannel, per chaldron, $7 50; Anthracite, per ton (2,000 lbs.), $4 a $4 75.

COCOA.—Per lb., 10½c.

COFFEE.—Per lb., 15½c. a 19½c.

COPPER.—Per lb., 20c. a 24c.

CORDAGE.—Manilla hemp, per lb., 8c.; Russian, 11c.

COTTON.—Per lb., 18½c. a 23½c. From the 1st to the 22d of October, none has been exported from New York. In the same space of time last year, 16,955 bales were exported; this year 3,290 bales have been imported.

DOMESTIC GOODS.—Shirtings (bleached), 26 and 32 inches wide, per yard, 8½c. a 10c; Sheetings (bleached), 34 inches wide, 9½c. a 11½c., Drillings, 27 and 30 inches wide, 9c. a 12c.; Canton flannels (bleached), 11c. a 16c.; Calicos (fancy), 6c. a 11c.; Cloths (all wool), $1 50 a $3; Satinets, 30c. a 60c.; Flannels, 15c. a 30c.; Sheep's grays, 60c. a 70c.; Kentucky Jeans, 8c. a 18c. The domestic trade is very good; manufacturers have had no cause to utter complaints.

FLOUR.—Per bbl., $5 35 a $7; Rye, $3 a $3 25; Corn meal, $2 75 a $3 20.

GRAIN.—Wheat, per bushel, $1 15 a $1 50; Rye, 76c. a 79c.; Oats, 40c. a 42c.; Corn, 61c. a 69c.; Beans, $1 90 a $2 10. The flour market has been quiet lately, but the demand for grain continues very active. During three days last week, the sales amounted to 1,100,000 bushels. The French wheat crop has been very deficient, but the English has been an average crop according to latest accounts from abroad.

GUNNY BAGS and CLOTH.—Per yard 10c. a 10¼c.

GUNPOWDER.—Per 28-lb. keg, $3 25 a $5 25.

HEMP.—American (unwashed and dressed), per ton, $100 a $170; Russian (clean), $220.

HIDES.—Per lb., 6c. a 23c. The great variety of hides causes a great range in their prices; the dry Buenos Ayres bring the highest prices. The stock on hand is large, being 310,000 hides, but the demand is quite active.

INDIA RUBBER.—Per lb., 19c. a 35c.

INDIGO.—Per lb., 60c. a $2 50. A very small stock on hand.

IRON.—Scotch pig, per ton, $24 a $25; American, $18; Swedes bar, $77 a $80; English bar, $52 a $55; Russian and English sheet, per lb, 3½c. a 16½c.

LEAD.—Per 100 lbs., $6 a $6 25; Pipe, $7 50. The price of lead is rising, owing to the great demand for it by government contractors.

LEATHER.—Oak sole, per lb., 26c. a 34c.; Oak upper, rough, 28c. a 30c.; Hemlock sole, 15c. a 22c.; Hemlock upper, 23c. a 25c. The demand for oak tanned leather has been unprecedented, owing to the army regulations requiring all military shoes and boots to be made of such tanned leather. The Pennsylvania oak tanners have reaped a golden harvest.

LUMBER.—Yellow pine, per M. feet, $35 a $40; Western oak, $30 a $35; White pine (Albany boards), $20 a $22; Spruce flooring, $20; White wood (1 inch), $25; Shingles (shaved), per bunch, $2 75 a $3; Staves (white oak), $40 to $100. The lumber market is improving slightly.

MOLASSES.—Per gallon, 24c. a 55c.

NAVAL STORES.—Turpentine, per gallon, $1 60 a $1 62½; White rosin, per 280 lbs., $5 50a $8 50; Common rosin, per 310 lbs., $4 50 a $4 75.

OILS.—Palm, per lb., 8c.; Linseed, per gallon, 69c. a 70c.; Whale, 42c. a 55c.; Sperm, $1 15 a $1 45; Petroleum (crude), 16c. a 18c.; Petroleum (refined), 35c. a 40c.; Kerosene (coal), 55c. a 60c.; Lard, 70c Rosin, 25c. a 35c.

PROVISIONS.—Mess beef, per bbl., $4 a $18; Pork, $9 a $15 Hams, per lb., 5c. a 6c.; Butter, 8c. a 7c.; Cheese, 5c. a 7c.

RICE.—Per 100 lbs., $6 25 a $7 75.

SALT.—Foreign, per bushel, from 23½c. to $1 70.

SALTPETER.—Per lb., 8½c. a 12½c.

SOAP.—Per lb., 5c. to 13¾c.

STEEL.—English, per lb., 14c. a 16c.; American spring, 5c. to 5½c American blister, 8c. to 13c.

SUGAR.—Brown and white, per lb., 7¼c. a 10⅞c.

TEA.—Per lb., from 22c. to 77c.

TIN.—Per lb., 26c. a 30c.; Plates, per box, $5 75 a $8 25.

TOBACCO.—Per lb., 5c. a $1. There are a great many varities of tobacco. The lowest are seed leaf fillers; the highest, Havanna wrappers.

WOOL.—American Saxony fleece, per lb., 45c. a 48c.; American merino, 44c. a 48c.; South American (unwashed), 9c., lowest; California (fine), 27c. a 32c.

ZINC.—Sheets, per lb., 7¼c. a 7¾c.

10,000 Sold to Agents.

About ten thousand copies of the SCIENTIFIC AMERICAN are regularly sold to local agents in various parts of the country. We should be glad to have this number greatly increased. One of our friends, writing from Worcester, Mass., informs us that he has induced several of the workmen in his shop to take the paper regularly from the news agent. Will not all of our friends who receive the paper in this manner, urge some of their friends to do likewise? Thus they will increase the weekly edition of our paper, and also help the business of the "news dealer," who, next to the parson and the doctor, is the most useful and entertaining man in the village.

WE shall probably have as this year's product in our loyal States, in our two great staples of Indian corn and wheat, an aggregate of five hundred millions of bushels.

THE monument in honor of Jacquard, the loom inventor, has been inaugurated at Lyons, France, with approbriate ceremonies.

© 1861 SCIENTIFIC AMERICAN, INC.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING OCTOBER 22, 1861.

Reported Officially for the Scientific American.

PATENTEES READ THIS.

The new Patent Laws which went into force on the 2d of March last, authorized the Commissioner of Patents to have all the specifications which form part of the Letters Patent printed.

This is a wise provision, and it renders the documents much handsomer than the old system of engrossing them on parchment; besides, in passing before the printer and proof reader, the clerical errors, which were often made by the copyist, are mostly obviated, thus rendering the patent more likely to be correct.

But to afford the printer and proof reader an opportunity to do their work properly, the Patent Office is obliged to withhold the Letters Patent after granting them, from *four to six weeks* after the claims are published in the SCIENTIFIC AMERICAN.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

2,505.—Ethan Allen, of Worcester, Mass., for Improvement in Revolving Fire Arms:

I claim operating the lever stop, G, of revolving fire arms by trigger, H, in combination with a tumbler, P, and spring, K, substantially as set forth and described.

2,506.—S. W. Baker, of Provideuce, R. I., for Improvement in Woven Endless Belts:

I claim the mode described of forming and uniting the ends of belts or bands, or of other thick material composed of thick woven fabric, as specified, whereby they present, when finished, no perceptible seam at their lap or juncture.

2,507.—A. P. Barlow, of Dixon, Ill., for Improved Washing Machine:

I claim the swinging rubber, E, scolloped rollers, b b, roller, B, blocks, e c, and spiral spring, f f, when the whole shall be constructed and arranged in the manner and for the purpose specified.

2,508.—R. H. Blair and A. W. Beatty, of Saltsburg, Pa., for Improvement in Combined Clover Stripper and Hay Rake:

We claim the shaft, I, provided with the lever, K, and attached to the frame, C, of the axle, A, when combined and used in connection with the raking device and clover stripper, as set forth.

[The object of thisinvention is to combine a clover stripper with a hay rake in such a manner that by a slight adjustment the device may be used in either capacity equally as well as if made specially for either purpose, and thereby obviate the necessity of the farmer purchasing two entire or distinct machines for accomplishing two different kinds of work.]

2,509.—M. C. Bogia, of Philadelphia, Pa., for Improvement in Rammers for Cannon:

I claim the head or block, A, the gum-elastic block, B, screw bolt, D, handle, H, and cover, G, the whole being constructed, arranged and operating substantially as and for the purpose set forth.

2,510.—Chauncey Bush, of New York City, for Improvement in Camp Pans and Bakers:

I claim, as a new article of manufacture, a camp pan and baker, constructed with inner and outer walls, between which non-conducting material is interposed, and the utensil adapted to be used either as a common pan or as a baker, substantially as described.

[The object of this invention is to obtain a cooking utensil of convenient and compact form for soldiers and hunters' use, and it consists of two pans, constructed with double sides and bottoms, with non-conducting material interposed between them, the pans being adapted to be used either singly, in the ordinary way, or attached together to form a baker, which, when filled with the article to be baked, is buried in hot ashes, or placed in an open fire, and the article cooked in an expeditious manner, without danger of injury thereto from excessive heat.]

2,511.—W. Z. W. Chapman, of New York City, and J. W. Chapman, of Hyannis, Mass., for Improvement in Carriage Curtain Fastenings:

We claim the constructing of the catch or knob, substantially as specified.

We also claim the noiseless grommet fastening, as and for the purposes specified.

2,512.—Thomas Clancy, of Chicago, Ill., for Improvement in Cutting Trowsers:

I claim the method of cutting trowsers and overalls, as described, in which one half of the article is included within two parallel diagonal lines drawn across the material.

2,513.—Henry Cook, of Manchester, England, for Improvement in Hoop Skirts. Patented in England October 25, 1860:

I claim the use of crinoline or steel or other suitable material of a wavy or corrugated form in the manufacture of petticoats or skirts, as set forth.

[The nature of this invention is explained by the claim. The object of the invention is to make the dress hang in uniform and graceful folds.]

2,514.—Truman Cooley, of Brockport, N. Y., for Improvement in Feathering Paddle Wheel:

First, I claim the plate, P, and manner of constructing the friction rollers, L, as connected with and adjusted to the flange, J, by the slots, l, as shown.

Second, I claim the manner of constructing and effecting the eccentric motion of the wheels, I and H, operating and feathering of the paddle, C, by the crank, Fig. 6, in combination with the lignum-vitæ box, Y, and the tapering journal, Fig. 7, also in combination with paddle, C, and paddle bar, F, with the diagonal and parallel braces, m, when constructed and arranged in the manner and for the purpose substantially as set forth.

2,515.—S. W. Cox and J. H. Trowbridge, of New Haven, Conn., for Improved Trace Fastenings:

We claim the trace fastening, C C′ c, constructed, applied and operating as described, in combination with a whiffletree and the eye in the journal thereof, as and for the purposes set forth.

2,516.—George Crompton, of Worcester, Mass., for Improvement in Looms:

I claim the operation of the crank on the rocker plate and the combination therewith of the connection to the lifter and depresser, as and for the purpose set forth.

Also the arrangement of the lifter and depresser for producing an incline to the shed, as described.

2,517.—Henry Davies, of Portsmouth, Ohio, for Improved Apparatus for Heating Air for Blast Furnaces, &c.:

I claim, first, The pipes, C, boxes, B and F, and covers, D, when constructed, combined and arranged substantially as and for the purposes set forth.

Second, The construction and use of tubes through which air is to be passed for the purpose of being heated, with an internal spiral partition or screw, substantially as set forth.

2,518.—William Ellmaker, of New Holland, Pa., for Improvement in Self-Acting Brakes for Carriages:

I claim the arrangement of the rod, G, with itseye, I, spiral spring, H, hook end or ends, G′, in combination with the lever, E, tulcrum and pin, e, and rubber, F, when arranged and combined, substantially as set forth for the purpose specified.

2,519.—Oscar Falke, of New York City, and Edward Simon, of Washington, N. J., for Improvement in Arrangement of Metallic Plates for Vulcanizing Rubber and other Gums:

I claim the described mode of arranging and treating india rubber, gutta percha and other vulcanizable gums, substantially as described for the purposes specified.

2,520.—Gustavus Finken, of Brooklyn, N. Y., for Improvement in the Manufacture of Cube Sugar:

I claim, in the manufacture of cube sugar, the preparation of the granular sugar for the molding or cube-forming apparatus by treatment with steam, substantially as described.

2,521.—George Hamel, of Abington, Pa., for Improvement in Stoves:

I claim the application of a permanently-fixed dust chamber, A; to the grate front of a stove, the said chamber being open to the ash space below, and being provided at its upper part with an adjustable opening, g, and a damper, h, and its lower part with a door, i, the whole being constructed and arranged to operate substantially in the manner described and set forth and for the purpose specified.

2,522.—J. W. Hayes, of Newark, N. J., for Improvement in Apparatus for Printing Bank Notes:

I claim, first, The plunger, J, with a rubber or analogous face or covering in combination with the chase, I, and platen, B, operating in the manner and for the purpose substantially as described.

Second, The levers, E H, step block, G, and platen, B, with the plate, A, and screw, D, the whole combined and operating in the manner and for the purpose substantially as described.

2,523.—C. W. Irwin, of St. Louis, Mo., for Improved Cot Bed:

I claim the head and foot pieces, A A, rails, B B, and legs, c c, when the whole are made and arranged with respect to each other, substantially in the manner described for the purpose specified.

2,524.—Wm. B. Johns, of Georgetown, D. C., for an Improvement in Convertible Cloaks and Tents:

I claim the addition of a triangular shaped flap, B, to the rectangular shaped body, A, of my improved convertible military equipment when the said military equipment has substantially the form and proportions shown in the accompanying drawings.

When my improved military equipment has substantially the shape represented in the accompanying drawings, I also claim forming a slit, p, in the said equipment in the position shown in said drawings, and for the purpose set forth.

When my improved military equipment has substantially the shape represented in the accompanying drawings, I also claim furnishing one end and one side of the rectangular portion thereof with a single series of hooks, e e, and a double series of eyes, f f, substantially as represented in said drawings.

2,525.—G. C. Lane, of Buffalo, N. Y., for an Improved Camp Chest:

I claim the combination and arrangement of the supplemental covers, B1 and B2, hasp, E, movable dowel, b, and locking device, F, operating substantially as set forth and for the purpose specified.

2,526.—C. F. Leisen, of Philadelphia, Pa., for an Improvement in Breech-loading Ordnance:

I claim the combination of the chambered breech, constructed and fitted to the body of the gun as described, the ring, C, and the slide, D, when the whole are arranged to operate and to present the breech for loading in the position and condition described.

[This invention consists in a certain novel mode of applying a chambered breech in combination with the body of a cannon, whereby very great facility is afforded for loading.]

2,527.—Louis Lelong and John Decamp, of Newark, N. J., for an Improvement in Implements for Feeding Percussion Caps:

We claim the percussion cap holder and primer, when constructed, arranged and combined, substantially in the manner and for the purpose set forth.

2,528.—J. B. Love, of Philadelphia, Pa., for an Improved Means of Attaching Armor to Navigable Vessels and Water Batteries:

I claim, first, The manner described of constructing the plates so as to combine them together with each other and the walls of an iron war vessel or water battery, the same consisting of the flush lapping of the edges of the plates, the intermediating packing, E, and the conical draw bolts, D, the whole being constructed and combined together with the wall, A, substantially in the manner described and set forth.

Second, I claim the projecting flange, c, on the plates of the upper series, B, when the same is made to rest directly upon the upper edge of the wall, A, substantially in the manner described, and for the purpose of supporting the said plates more securely.

Third, I also claim the cap, F, when the same is constructed as described and applied to operate in combination with the upper edge of the wall, A, and the upper series of plates, B, substantially as described and for the purposes specified.

2,529.—Wm. McIntosh, of Wilmington, Ill., for an Improvement in Harvesters:

I claim, in combination with the serpentine cam, H, and rollers, f f, or their equivalents, the rollers, d d, placed in the bar, c, of the main frame, A, and arranged relatively with the sickle, K, so as to serve as bearings for its back edge behind the cam, H, as shown and described.

[This invention relates to an improved means for driving or communicating motion to the sickle, whereby the desired result is attained by a very simple and efficient mechanism which is not liable to get out of repair, and which will form the most direct practical means for accomplishing the object.]

2,530.—Chandler McWayne, of Sacramento, Cal., for an Improvement in Railroads and Cars:

I claim, first, The elevated rail, A, when used in connection with a car, B, placed or suspended thereon in a state of equipoise, substantially as and for the purpose set forth.

Second, The suspending of the seats, C, in the car, B, from segment plates, J, connected with bars, K L, which are actuated through the medium of the levers, M P, for the purpose of adjusting the seats laterally when required, for balancing the car on the rail.

Third, The employment or useof the weight, I, attached to the windlass, G, on the top of the car, in combination with the inclined troughs, F F, placed in the car, all arranged for the purpose of balancing the car on the rail.

Fourth, The adjustable bars, Q Q, placed one at each side of the car, B, and arranged as shown, for the purpose of sustaining the car when stationary in a horizontal position, as set forth.

2,531.—John Melling, of Bolton, England, for an Improvement in Machines for Making Bricks:

I claim in one machine the combination with the mechanism for forming bricks by pressing the clay into molds, of an air pump for exhausting the air and gases from the material in the molds, so that the operations shall be simultaneous, as set forth.

I also claim the combination and arrangement of the devices for performing the operations of filling the molds, pressing the materials therein, exhausting the air and gases therefrom, and removing the bricks or other products made from the machine, substantially as described and for the purpose set forth.

I also claim the combination with and arrangement in relation to a traveling mold block or plate having any required number of molds formed therein of any desired size or shape, of the filling, pressing, air exhausting and pushing-off devices, so as to operate as described, whereby such intermittent motion is imparted to the said mold block as to bring it in apposition with the said filling, pressing, air exhausting and pushing-off devices at the proper times, as set forth.

I also claim the perforated plate, Q′, in combination with the air pump used for exhausting air or gases from the material in the molds as described.

I also claim so arranging the plunger bearings as to cause the plungers to operate with permanently elastic yielding pressure while filling the molds, substantially as described.

I also claim the arrangement of devices for removing the bricks or other articles when formed from the machine, the same consisting of the lever, z, and the pushing blocks, D, operated substantially as described.

I also claim the combination of devices whereby an intermittent rotary motion is given to the mold block or plate in such a manner as to carry the molds or dies in the proper localities for the material with which they are filled, to be operated upon and remain stationary during such operations, the same consisting substantially of the eccentric wheel, F′, wheel frame, G, and ratchet wheel, K, operating together as described.

2,532.—J. H. Merrill, of Baltimore, Md., for an Improvement in Breech-loading Firearms:

I claim the combination of the groove or analogous contrivances, x x, with the groove, i, in which the mechanism by which the levers and plug are controlled in their movement, as represented in the accompanying drawings, whereby the plug or breech pin may be withdrawn from the channel in which it moves, substantially as described.

2,533.—Jacob Meyer, of Chicago, Ill., for an Improvement in Grain Separators:

I claim the arrangement of the screen, c, fanning box, m, and curved fans, n, wind chamber, g, and sliding box with its separating plates, p and r, the whole constructed and operating substantially as and for the purpose set forth.

2,534.—John Myers and Geo. Elbreg, of Cincinnati, Ohio, for an Improvement in Street Sewers:

We claim the arrangement of doors, E E, yielding corner piece, F′, curb, B, and inclined seats, c, or equivalent devices for the automatic closing of sewer inlets without obstructing the passages thereof, in the manner set forth.

2,535.—Wm. Neff, of Center Hall, Pa., for an Improvement in Harvesting Machines:

I claim, first, In combination with a rolling couplingarm, the hinged V-shaped brace with its bosses for the purpose of so uniting the finger bar to the main frame as that it may conform to the undulations of the ground over which it passes, and be turned up against and be carried by the main frame when transporting the machine from place to place, substantially as described.

I also claim, in combination with a hinged yielding finger bar, a hinged platform, a hinged side piece and the flexible and adjustable suspending devices, so that the platform may be adjusted as to hight, and so that the finger beam and platform may be folded up against, to be carried by, the main frame when transporting the machine from place to place, substantially as described.

I also claim, as a clutching and unclutching device for making the wheels and axle of a harvesting machine move together or independently of each other, the combination of the ratchets, u, star wheels, v, with their springs, slots and feathers, as described and represented.

2,536.—M. M. Pettes, of West Concord, Vt., for Improvement in Boots and Shoes:

I claim the arrangement of the flanged metallic heads, E, between the soles, A B C D, in the manner shown and described.

[This invention relates to a certain means employed for securing metal heads in the soles and heels of boots and shoes, for the purpose of rendering the same durable, the invention effectually preventing the casual detachment of the heads from the soles and heels, and admitting of moreefficient heads being used than hitherto, and which will be capable of sustaining much greater wear.]

2,537.—Anthony Pfund, of New York City, for Improvement in Shells for Ordnance:

I claim the construction of projectiles for different guns, made of different sizes, and of shapes according to the principles set forth in the specification, to consist of two principal parts of shells, united and secured together with lead or other soft metal composition, and arranged in such manner that the surrounding outside shell forms the hammer to the nipple and percussion cap, or nipples and caps, attached to the inside shell, which shell, when charged with powder or other exploding materials, and shot from a gun, will explode at the time when the projectile strikes a suitable object, in the manner set forth.

2,538.—J. L. Piper, of Altoona, Pa., for Improvement in Bearing Block for Bridge Trusses:

I claim making the tubes for the bolts separate from the bed of the block, so that they can yield or vibrate when required without injuring or breaking either the bed or tube.

I also claim rounding the ends of the tubes, and fitting them to a curved seat in the bed, so that they can vibrate without materially lessening the bearing surface between the bed and tube, substantially as described

2,539.—M. T. Ridout, of Milwaukee, Wis., for Improvement in Bootjack:

I claim the combination of the tooth jaws, A A a, and sliding toe piece, C c, constructed and operating substantially as and for the purpose set forth.

2,540.—Ezra Ripley, of Troy, N. Y., for Improvement in Repeating Gun Battery:

I claim the detachable rotary discharging hammer, A, and separable, many-chambered breeching, B, when they are constructed and secured in combination with the cylindrical series of barrels, c, so as to permit convenient and rapid firing, and the ready detachment and re-attachment of the said chambered breeching and hammer, substantially as described and shown.

2,541.—Jacob Ruth, of Philadelphia, Pa., for Improvement in Apparatus for Removing Invalids:

I claim the frame, I, with its bands or straps, in combination with the traversing platform, and the system of raising and lowering cord described, or their equivalents, for the purpose specified.

2,542.—Christian Sharps, of Philadelphia, Pa., for Improvement in Hammer Guard to Firearms:

I claim the curved guard, D, with its projection, y, in combination with the hammer C, its collar, x, and pin, q, the whole being arranged on a firearm for discharging metallic cartridges, as and for the purpose set forth.

2,543.—Suspended.

2,544.—Melancthon Stilwell, of Manlius, N. Y., for Improvement in Bee Hives:

I claim, first, Constructing bee hives of straw, by securing the straw mats, A′, to the wooden frame, by means of the clamping corner boards, c, pegs, b, and cords, e, substantially as set forth and described.

Second, The straw mat, D, when constructed and used, as and for the purposes set forth and described.

2,545.—F. Streubel and August Roos, of New York City, for Improvement in Coolers for Beer and other liquids:

I claim the cooler for beer and other liquids as described and referred to in the drawings attached, as set forth in the specification, or any other substantially the same, to produce the intended effect.

2,546.—B. F. Taber, of Buffalo, N. Y., for Improvement in Rotary Pumps:

I claim, first, The formation of the shell with the concentric parts,

© 1861 SCIENTIFIC AMERICAN, INC.

e g and f h, and eccentric parts, e h and g f, as and for the purposes described.

Second, So constructing and arranging the valves, valve-cylinder and shell, as that the valves will not be subjected to a transverse movement while doing their work, for the purposes and substantially as set forth.

2,547.—A. C. Vautier, of Paris, France, for Improved Mode of Extracting Filamentous Matter, similar to Silk, Cotton and the like, from the Bark and Leaves of Various Trees:

I claim the method or process described of extracting the filamentous matter, of a silky, cottony and other similar nature, contained in the bark and leaves of the mulberry, elm, peach and other trees and shrubs, so as to render the product thus obtained convertible into yarns and tissues, substantially as set forth.

2,548.—W. E. Vincent and C. B. Northrup, of New York City, for Improvement in Spring Rocking Horses:

We claim the combination of the flat spring, E, with the check spring, G, arranged and applied to the horse, substantially as and for the purpose set forth.

[The object of this invention is to simplify and economize in the construction of spring rocking horses, and render the same more durable and efficient than those previously constructed. The invention consists in a novel application of a spring and check, substantially as shown and described, whereby the ordinary coiled or flat wound spring are avoided, and the desired end fully attained.]

2,549.—H. M. Wilson, of Newark, N. J., for Improvement in Operating Window Shutters:

I claim the levers, worm and screw or worm wheel and the shaft with the slotted top, when constructed and combined, substantially in the manner and for the purpose specified.

2,550.—T. P. Yates, of Concord, N. H., for Improvement in Newspaper Files:

I claim the expanding bellows back, A, in combination with the elastic tapes, G, cutting needles, E, and loops, D, when the same are so arranged as to form a newspaper file, substantially as described.

2,551.—John Davis (assignor to P. H. Floyd), of Elmira, N. Y., for Improvement in Holdback for Carriages and other vehicles:

I claim a holdback composed of two parts—one part attached to the thill, the other part attached to the harness, constructed and operating substantially in the manner and for the purpose set forth.

2,552.—C. G. Mann, of Walpole, Mass., assignor to A. B. Ely, of Newton, Mass., for Improvement in Sewing Machines:

I claim delivering threads, braids or cords in the path of and before the needle of a sewing machine, for the purpose of having the same sewed or embroidered upon cloth or other substance, through or by means of a shaft, rotating continuously or alternately, and operating substantially as described.

2,553.—James Pine (assignor to himself and J. J. Viele), of Troy, N. Y., for Improvement in Harvesters:

I claim, first, The combination of the gear frame, F, and gear wheel, G H, journaled independently upon the shaft, E, secured rigidly in the main frame, C, in the rear of the axle, A.

Second, The combination of the finger bar, H′, joint, f, gear frame, F, fixed shaft, E, brace rod, I, axle, A, and main frame, C, constructed, arranged and operating in the manner and for the purposes shown and explained.

2,554.—D. F. Randall (assignor through mesne assignments to S. S. Rogers and Green Kendrick), of Hartford, Conn, for Improved Burnishing Machine:

I claim the combination of the pivoted spring spindle burnisher holder, d e a, with the pattern D, substantially as and for the purpose described.

I also claim the combination of the slotted flange plate, F, with the Z-shaped stud, H, and the slotted lever, K, arranged and operating substantially as and for the purpose described.

2,555.—Henry Randall, of Philadelphia, Pa., assignor to himself and Isaac P. Baldwin, of New York City, for Improvement in Ship Building:

I claim, first, Making the main deck timbers of a steamship project outboard sufficiently far to be trimmed off and be capped by a horizontal arch of sufficient curvature to embrace the paddle boxes, and extending nearly from stem to stern, substantially as described.

Second, I claim, in combination with the above, making a sufficient number of the ribs extend above the main deck timbers, to which they are firmly connected, far enough to be trimmed off and be capped by a vertical arch spring from stem to stern, or nearly so, substantially as described.

Third, I claim the combination with the foregoing. The inverted counter arch, substantially as described.

And, lastly, I claim also, in combination with all above the adjustable iron tension braces, E E. (Fig. 1), substantially as described.

2,556.—F. J. Vittum, of Boston, Mass., and E. M. Stevens, of Medford, Mass., assignors to Alfred B. Ely, of Newton, Mass., for Improvement in Breech-Loading Fire Arms:

I claim, first, The charge chamber materially larger in diameter than the bore of the gun and containing a charge of powder less in bulk than the area of said chamber, substantially as and for the purposes set forth.

Second, The device for moving and locking the laterally-moving chambers, constructed and operating substantially as set forth.

2,557.—J. G. West, Jr. (assignor to Jane H. West and M. C. Boyer), of Norristown, Pa., for Improvement in Valves and Valve Motion for Steam Engines:

I claim, first, The arrangement described of the steam valves, H, with their seats and chests, and the exhaust valves, K, with their seats and chests in respect to the cylinder for the purposes specified.

Second, The arrangement and combination described of the shaft, M, the sleeve N, with its projections, e and e′, the levers, S and Y, and steam valves, H.

Third, The arrangement and combination described of the shaft, M, its cams, i and i′, the levers, X and Z, and the exhaust valves, K.

2,558.—C. S. Westlandt, of Providence, R. I., assignor to Adin Alexander, of Providence, R. I., and W. J. Innis, of North Providence, R. I., for Improvement in Lubricating Cup:

I claim the cup for holding the lubricating material in combination with the follower, spring guide, rods and friction straps, substantially as described.

RE-ISSUE.

126.—A. V., J. D. and F. Blanchard, of Palmer, Mass., assignees of G. C. Howard, of Hardwick, Mass., for Improvement in Spade, Shovel or Dung Fork Handles, Patented July 21, 1857:

I claim a handle for shovels and similar or analogous implements, having its eye, b, and holder, B, formed by splitting or sawing longitudinally for a suitable distance the end of the bar, A, and then bending the parts or arms, a a, formed by the split or kerf, in the form of a fork, and securing the holder, B, in any suitable way between the parts or arms, a a, whereby a new and improved article of manufacture is obtained for the purpose specified.

[This invention is designed to supersede the ordinary mode of forming the eye and holder of the handle, by economizing in stock and rendering the handle more durable than those of usual construction.]

DESIGNS.

114.—F. Gerard, of New York City, for Design for a Picture Frame.

115, 116, 117.—Elemir J. Ney (assignor to Lowell Manufacturing Co.), of Lowell, Mass., for three Designs for a Carpet Pattern.

118.—Henry Terry, of Plymouth, Conn., for Design for a Clock Case Front.

THE English clipper ship *Fiery Cross* has steel masts.

Notes and Queries

G. W. H., of N. Y., asks the following questions:—In a combination claim for a patent, does not the changing of the combination (essentially) evade the patent? Answer.—Yes. When a claim is made by using the term "arrangement" of certain (old) devices, so that the novelty consists entirely in the bringing together of well known portions of different machines, so as to do with the new machine what had formerly been done by two or more machines, is it not in effect a combination claim, although the word "combination" is not in use? Ans.—Yes. When a portion, say half or three-fourths of this arrangement is left out and supplied by entirely different devices to accomplish the same object in a better manner, does this infringe upon the former arrangement or patent? Ans.—No.

L. D. F., of ———.—We have tried many compounds for preserving leather, but never found anything else so good as common paste blacking. Any alkali will remove grease from clothing. Ammonia is the mildest. Pour a little aqua ammonia upon the grease spot, and then wash with warm water. Hydrochloric acid diluted for purification may be concentrated by distilling an additional quantity of the impure, and passing the fumes into the diluted solution. Kerosene is a trade name for oil manufactured by a particular company, and petroleum is the name applied to all rock oils. Your neighbor's water may be deodorized by filtering it through freshly-burned charcoal. There can be no noiseless and powerful gunpowder. Benzine is the same as benzole. Camphene is double-distilled spirits of turpentine.

N. D., of N. Y.—You may doubtless hold your theory in spite of ridicule, but we are very sure that you would not hold it if you should inform yourself in relation to the known facts of the solar system.

H. W. J., of Ohio.—Almost every war implement possessing the least degree of novelty and utility has been illustrated in the columns of the SCIENTIFIC AMERICAN, and its pages furnish the best illustrated history extant of the progress of military inventions. You will find a centrifugal gun, invented by Alfred Potts, of Philadelphia, Pa., illustrated on page 361, Vol. XII. (old series), of our journal.

J. M. D., of Ashland.—Your spring seat saddle appears to be new and patentable. In what State do you reside? There are several Ashlands.

J. L., of Marathon.—We think it probable that you can get a patent on your iron gate; but to enable us to understand it more thoroughly, we advise you to send us a sketch and description of it. We should have addressed you by letter, but do not know in what State you reside, as there are a number of Marathons.

J. K., of Wis.—If you are familiar with the French language, you will find Duhamel's "Calculus" the most suitable for the next study in your course. He has an extraordinary faculty for making the higher mathematics clear. Write to Balliere Brothers, of this city, for price, &c. Next to this, Bowditch's "Laplace" is recommended. It is out of print, but can be found at the second-hand bookstores. Not long since a copy was for sale at the corner of Fulton and William streets, in this city.

J. M. S., of Ohio.—Common pitch is the best cement which you can use for the aquarium. It does not communicate any deleterious quality to the water like cements made with litharge and oil.

J. M. S., of L. I.—The air pumps of the engines of the new gunboats are made large, so as to answer either for surface or inside condensers should the former become leaky.

J. K. W., of Kansas.—There is no work published on American millwrighting that is up to the practice of the present day.

G. D. G., of N. Y.—The Whitworth rifle has a sliding bolt which has a half turn screw upon it for closing the breech. Several rifles have been made with hinged breech plugs.

J. B. O., of Md.—Telescopic sights for rifles are simply small telescopes fastened on the upper side of the barrels, with threads of spiders' web crossing in their axes.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, Oct. 30, 1861:—

N. McC., of N. Y., $15; E. S., of Vt., $15; J. S., of N. Y., $25; L. W. P., of Mass., $15; O. & S., of Mo., $12; B. M. S., of N. J., $15; J. C. N., of Pa., $20; C. E. H., of Mich., $10; T. A. G., of Ill., $15; J. D., of Iowa, $20; T. S. W., of N. Y., $20; D. I. S., of N. Y., $15; V. and L., of Iowa, $25; W. L. F., of N. J., $25; J. McC., of Mass., $25; S. S., of Mass., $20; G. W. Van B., of Wis., $20; D. B. A., of N. Y., $20; T. S., of N. J., $20; H. W. B., of N. Y., $25; F. S. M., of N. Y., $25; E. D. L., of R. I., $15; C. & B., of Mich., $15; H. G., of N. Y., $25; C. M., of N. Y., $15; E. T., of Pa., $25; D. W. S., of Mass., $15; C. W. L., of N. Y., $15; J. H., of Maine, $15; M. P. L., of Maine, $25; E. S., of N. Y., $15; G. F. H., of Ill., $15; E. B., of Conn., $25; G. S. K., of Iowa, $30; H. & J., of Conn., $250; W. H. G., of Pa., $20; E. P. R., of N. Y., $20; J. M. L., of N. Y., $20; D. S., of Cal., $20; E. and B., of Vt., $20; L. F., of Ohio, $20; J. P. T., of N. Y., $20; F. W. W., of N. Y., $25; J. S., of N. Y., $40; J. T., of N. Y., $40; W. H., of N. Y., $15; T. V., of Cal., $25; A. K., of Ill., $15; S. J. A., of Cal., $20; M. C., of Maine, $15; J. K. A., of Ohio, $30; J. L. L., of N. Y., $30; L. D. C., of Mich., $15; W. H. H., of N. J., $15.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Oct. 23, to Wednesday, Oct. 30, 1861:—

E. H., of Conn.; A. K. R., of Vt.; H. W. B., of N. Y.; O. and S., of Mass.; J. H., of Maine; V. and L., of Iowa; E. B., of Conn.; J. S., of N. Y., two cases; E. T., of Pa.; J. S., of N. Y.; T. V., of Cal.; C. E. H., of Mich.; F. W. W., of N. Y.; M. P. L., of Maine; J. T., of N. Y.; J. McC., of Ohio, W. L. F., of N. J.; S. J. A., of Cal.; C. A., of N. Y.; H. G., of N. Y.; J. L. L., of N. Y.; F. S. M., of N. Y.; G. S. K., of Iowa.

RATES OF ADVERTISING.

Thirty Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

CHANGE IN THE PATENT LAWS.

PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 4th of March, 1861, are now in full force, and prove to be of great benefi to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

Testimonials.

The annexed letters, from the last three Commissioners of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly, CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully, Your obedient servant, J. HOLT.

MESSRS. MUNN & Co.:—Gentleman: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, Your obedient servant, WM. D. BISHOP.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

© 1861 SCIENTIFIC AMERICAN, INC.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursue in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Interferences.

We offer our services to examine witnesses in cases of interference, to prepare arguments,and appear before the Commissioner of Patents, or in the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of "*Hints to Inventors*," Furnished free. Address MUNN & CO., No. 37 Park-row, New York.

The Validity of Patents.

Persons who are about purchasing Patent property, or Patentees who are about erecting extensive works for manufacturing under their Patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing Patent, before making large investments. Written opinions on the validity of Patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited For further particulars, address MUNN & CO., No. 37 Park-row, New York.

Extension of Patents.

Valuable Patents are annually expiring which might be extended and ring fortunes to the households of many a poor Inventor or his family. We have had much experience in procuring the extension of Patents; and, as an evidence of our success in this department, we would state hat, in all our immense practice, we have lost but *two* cases, and these were unsuccessful from causes entirely beyond our control.

It is important that extension cases should be managed by attorneys of the utmost skill to insure success. All documents connected with extensions require to be carefully drawn up, as any discrepancy or untruth exhibited in the papers is very liable to defeat the application.

Of all business connected with Patents, it is most important that xtensions should be intrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office, and the manner of presenting it. The heirs of a deceased Patentee may apply for an extension. Parties should arrange for an application for an extension at least six months before the expiration of the Patent.

For further information as to terms and mode of procedure in obtaining an extension, address MUNN & CO., No. 37 Park-row, New York.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American PatentAgency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

THE TINMAN'S MANUAL AND BUILDER'S AND Mechanic's Handbook.—Second edition; 208 pages. Price $1. This useful book will be sent by mail (free of postage) to any place in the United States or British Provinces on the receipt of price.
18 4* I. R. BUTTS & CO., Publishers, Boston, Mass.

PORTABLE STEAM ENGINES—COMBINING THE maximum of efficiency, durability and economy with the minimum of weight and price. They are widely and favorably known, more than 200 being in use. All waranted satisfactory or no sale. A large stock on hand ready for immediate application. Descriptive circulars sent on application. Address J. C. HOADLEY, Lawrence, Mass. 19 13

PROPRIETORS OF NEW INVENTIONS, PATENT and Quack Medicines, Improvements, &c., wishing to extend their sale and introduction into a foreign market, will please address circulars, catalogues or price lists, with best terms for export, to the address of Box 1,378, Post Office, Boston. 19 2

PARTIES HAVING ARTICLES TO DISPOSE OF which, if sold in the United States, are liable to a patentee's tariff, or subject to infringement of some patent, may learn of a foreign market by addressing Box 1,378 Post Office, Boston. 19 2

GUN FORGING.—PECK'S PATENT DROP PRESS, for gun and other forging. Manufactured by MILO PECK & CO., New Haven, Conn. 19 10*

WORLD'S FAIR.—A YOUNG N. Y. BUSINESS MAN intending to exhibit at the London Fair would also attend to ome other articles as his time will be but partly taken up with his own affairs. Best of reference. Address, EUROPEAN, Box 446 Newark, N. J.

IRON PLANERS, LATHES, FOUR SPINDLE DRILLS, Milling Machines, and other Machinist's Tools, of superior quality, on hand and finishing, and for sale low. For description and prices address NEW HAVEN MANUFACTURING COMPANY, New Haven, Conn. . 1 26

IMPORTANT AID TO NEW ENTERPRISES.—ANY desired information (free) about Rates of Advertising in city or country papers, or the cost of reaching by circulars any business class in the United States. GEO. BOWERYEM, Commission Agent,
1* New York City.

WARREN'S TURBINE WATERWHEEL (WARREN & Damon's patent), manufactur by the American Waterwheel Works, Boston, Mass.—We would say to our patrons and parties in need of Turbine Waterwheels for factories, flouring mills, grist and sawmills, &c., that we are now able to furnish the most powerful, economical, cheap and durable wheel in use. They are constructed upon the most scientific principles, with steel buckets, and are highly finished. Seven hundre are now operating success fully in places where the greatest economy in water is required. Send for pamphlet, with illustrations complete. Address ALONZO WARREN, Agent, 31 Exchange street, Boston, Mass. 18 6

FOR FREE DISTRIBUTION.—A PRACTICAL TREAtise on the Incrustration of Steam Boilers; its causes and effects. Its removal and prevention without injury. Address, H. N. WINANS, Box 6, New York P. O. 1*

NEW YORK OBSERVER FOR 1862.—IN ASKING the aid of all who may desire to extend the circulation of the *New York Observer*, it is proper for us to state distinctly the position it occupies with reference to the present condition of public affairs in our beloved country.

Having always maintained the duty of good citizens in all parts of the land to stand by the Constitution, in its spirit and letter, when that Constitution was assailed and its overthrow attempted, we accordingly at once gave a cordial support to the Government in its patriotic endeavor to assert its lawful authority over the whole land. Believing secession to be rebellion, and when attempted, as in this case, without adequate reasons, to be the highest crime, we hold

1. That the war was forced upon us by the unjustifiable rebellion of the seceding States.

2. That the Government, as the ordinance of God, must put down rebellion and uphold the Constitution in its integrity.

3. That every citizen is bound to support the Government under which he lives, in the struggle to reestablish its authority over the whole country.

4. That the Constitution of the United States is the supreme law of the Government as well as of the people; that the war should be prosecuted solely to uphold the Constitution and in strict subordination to its provisions: and the war should be arrested, and peace concluded, just so soon as the people now in revolt will lay down their arms and submit to the Constitution and laws of the land.

The distinctive features of the *Observer* are,

1. It is printed on a double sheet, so as to make two complete newspapers, one devoted to secular and the other religious matters; and these may be separated so as to make two complete journals, while the price for both is no greater than is charged for many papers smaller than either one of the two.

2. It gives every week a complete synopsis of the most interesting events in all the denominations, including those that are called Evangelical and those that are not; as every intelligent Christian wishes to be well informed respecting all of them.

3. It gives a well-digested epitome of the News of the Day, Foreign and Domestic, prepared with great labor and care, so that the reader is sure to be put in possession of every event of interest and importance to the public.

The foreign correspondence of the *Observer* is unrivaled, and has long commanded the admiration of intelligent men.

TERMS FOR NEW SUBSCRIBERS.

1. To each new subscriber paying in advance $2 50 for one year, we will send the paper and a copy of our Bible Atlas, with five beautiful colored maps.

2. To the person obtaining subscribers we will give $1 for each new subscriber paying $2 50 in advance.

3. To any person now a subscriber sending us one new subscriber and $4 we will send both papers for one year.

Specimen numbers of the *New York Observer* will be sent gratis to any address that may be forwarded to us for that purpose.

The state of the country renders it important for us and esirable for the churches, that a new and earnest effort e made to extend the principles of good government nd sound religious truth into all the families of the land. In every neighborhood there must be some who do not now take a religious newspaper, and who might with a little exertion be induced to subscribe.

SIDNEY E. MORSE, JR., & Co.,
Editors and Proprietors,
tf. 37 Park Row, New York.

STEAM GAGES.—PRICES VARYING FROM $10 TO $30. Old Gages repaired and exchanged for new and improved ones. JOHN ASHCROFT, Agent,
18 2* No. 50 John street, New York.

NONPAREIL WASHING MACHINE.—THIS Machine must take precedence of all other machines now in use, being the only one justly entitled to be considered as constructed on correct mechanical principles. Machines and State and county rights for sale by OAKLEY & KEATING. 73 South street, New York. 15 3m

---

THE NEW GOTHIC FURNACE—A GREAT IMPROVEment in heating, with all the advantages claimed for hot water or steam. Also Portable Heaters, Registers, Ventilators, Ash Sifters, old Java Coffee Pots, Polar Refrigerators. BARTLETT & LESLEY, Manufacturers, No. 426 Broadway, New York. 17 4

THE MOST DESTRUCTIVE CANNON PROJECTILE yet.—One half interest to any one who will pay the patent expenses. Address F. S. C., Boston, Mass. 17 4*

BRASS LIFT AND FORCE PUMPS, SHIP PUMPS, Steam Whistles, Gage Cocks, Oil Cups, and every variety Brass Work used by engine builders, manufactured by HAYDEN, SANDERS & CO., 84 Beekman street, New York. 14 13*

GUILD & GARRISON'S CELEBRATED STEAM Pumps—Adapted to every variety of pumping. The principal styles are the Direct Action Excelsior Steam Pump, the improved Balance Wheel Pump, Duplex Vacuum and Steam Pumps, and the Water Propeller, an entirely new invention for pumping large quantities at a light lift. For sale at Nos. 55 and 57 First street, Williamsburgh, and No. 74 Beekman street, New York.
9 tf GUILD, GARRISON & CO.

PUMPS! PUMPS!! PUMPS!!!—CARY'S IMPROVED Rotary Force Pump, unrivaled for pumping hot or cold liquids. Manufactured and sold by CARY & BRAINERD, Brockport, N. Y Also, sold by J. C. CARY, No. 2 Astor House, New York. 14tf

---

MACHINE BELTING, STEAM PACKING, ENGINE HOSE.—The superiority of these articles, manufactured of vulcanized rubber, is established. Every belt will be warranted superior to leather, at one-third less price. The Steam Packing is made in every variety, and warranted to stand 300 degs. of heat. The Hose never needs oiling, and is warranted to stand any required pressure; together with all varieties of rubber adapted to mechanical purposes. Directions, prices, &c., can be obtained by mail or otherwise at our warehouse. NEW YORK BELTING AND PACKING COMPANY:
JOHN H. CHEEVER, Treasurer,
14 13 Nos. 37 and 38 Park-row, New York.

ALBANY IRON WORKS, TROY, N. Y.—SEMI-STEEL Plates and Forgings.—We are prepared to furnish forged shapes of this approved metal, and without unnecessary delay, having large facilities for production. Among the uses to which this material is now applied, and with great success, we name, rifled cannon for government use; also rifle and musket barrel shapes, locomotive engine tires, locomotive engine axles, straight and crank, car axles, crank pins, plates for locomotive fire box, flue sheets, &c. It is peculiarly adapted for shafting, indeed, for all purposes where strength and rigid qualities are required, its tensile strength ranging from 90 000 to 118,000 lbs. to the square inch, nearly double that of the best iron.—Cast-steel forgings up to 1,500 lbs. each, likewise furnished. Communications addressed to CORNING, WINSLOW & CO., A. I. Works, Troy, N. Y., will be promptly responded to. Parties at the West can be supplied on addressing their orders to A. S. WINSLOW, Cincinnati, Ohio. 15 6m*

SOLID EMERY VULCANITE.—WE ARE NOW MANUfacturing wheels of this remarkable substance for cutting, grinding and polishing metals, that will outwear hundreds of the kind commonly used, and will do a much greater amount of work in the same time, and more efficiently. All interested can see them in operation at our warehouse, or circulars describing them will be furnished by mail.
NEW YORK BELTING AND PACKING CO.,
14 13 Nos. 37 and 38 Park-row, New York.

CRUDE PARAFFINE WANTED—FOR WHICH THE highest price will be paid for a good article well pressed. Address H. RYDER & CO., Patent Paraffine Candle Manufacturers, New Bedford, Mass. 12 tf

---

MILITARY FILTERS.—CANTEENS AND POCKET Filters, at 20 cents by the hundred. Syphon Filters at 50 cents, of porous stone, clean and durable. Manufactured by FRED. C. KRAUSE, 772, 8th avenue, corner of 54th street, N. Y., manufacturer of patent porous gas burners, for chemical and manufacturing purposes, &c. 18 3*

THE GRAEFENBERG MANUAL OF HEALTH.

This valuable family medical work, containing 300 pages, has been revised and improved, and elegantly illustrated with beautifully colored Engravings of the human system. Sent by mail to any part of the country on receipt of 25 cents. It is a complete guide to all diseases, and their cure.

Address letters to JOSHUA F. BRIDGE, M. D.,
Secretary Graefenberg Co., No. 2 Bond St., New York.

One of the leading New York Journal says:—"The popularity of this admirable and compendious work is well shown by this being the twenty-fourth edition of the Manual It contains a number of colored anatomical plates, and is a complete family physician, the best and most compendious that we have ever seen. Dr. Buchan's famous work is not to be compared in value to this excellent adviser. It is at once simple, popular, plain and explicit; and the mother, with such an adviser, is predared at once to apply the proper remedies in case of sudden attack of sickness in the family. In the country a copy of the Manual of Health is indispensable, and every family should possess one. It will save a hundred times its cost in doctors' bills, and, what is far better, will be the means of preserving many valuable lives to their families and relatives."

LIVE WITHOUT THE DOCTOR

SAVE MONEY AND GAIN HEALTH.—The expense and trouble consequent upon the necessity of employing a physician, is no small item in the yearly calculations of the head of a family.

The most of this, and in fact all, except when serious accidents require surgical operations, or where very violent vital diseases render an occasional call necessary, can be avoided by having the Graefenberg Manual of Health and an assortment of Graefenberg Medicines.

FAMILIES can save large sums in doctors' bills, and avoid much suffering, by using the Graefenberg Medicines and Manual of Health.—*New York Tribune.*

THE Graefenberg Manual of Health, together with their valuable series of Family Medicines, will enable a family to dispense in nine cases out of ten, with the cost of a physician.—*Observer.*

NEARLY fifteen years experience has gained for the Graefenberg Company's Institution the confidence and esteem of the American people, and the combination of professional treatment under the direct supervision of the Medical Board, with the preparation and sale of family medicines under authority of an act of the Legislature of New York, has formed a union of professional practice and commercial enterprise never before witnessed. At the present day the position of the Graefenberg Company's Medical Institute is unparalleled by that of any Public Charity or Medical college in the world.

THE Graefenberg Company wish it to be distinctly understood that their theory and practice is not based upon infallibility. What is claimed, and what is borne out by facts, is that the medicines are the result o the highest medical skill adapted to the compounding of simple and entirely vegetable medicinal preparations. The treatment is the most judicious application of these simple vegetable productions in aid of the great and equally simple laws of nature governing the human system in health and disease. In ninety-nine cases out of a hundred the Graefenberg treatment will certainly cure.

CONSULATE OF THE U. S. OF AMERICA, BOMBAY, Sept., 1860.

This is to certify that I am personally acquainted with J. F. Bridge, M. D., of the city of New York, and that he is a learned and skillful physician of high standing; and further, that I have used the Graefenberg Medicines according to directions given in the Graefenberg Manual of Health, for several years, to my entire satisfaction; and I can confidently recommend them to all who wish to save doctors' bills and enjoy good health.

L. H. HATFIELD,
American Consul, Bombay.

THE Graefenberg Institute combines the sale of medicine, medica advice, and the reception of patients for treatment in the Institute Buildings, No. 2 Bond Street, N. Y. Many of the leading public men in the country have spoken in the highest terms of the Graefenberg Institution and its theory and practice. Others who are unacquainted with the medicines, but who are aware of the integrity and truthfulness of the Resident Physician, have permitted him to refer to them for the truth of what he may say. Among these last we have noticed the names of Horace Greeley, of the *Tribune;* Prof. M. P. Jewett, of the Vassar Female College, Poughkeepsie; the Rev. E. H. Chapin, D.D., of New York; Prof. A. P. Peabody, of Harvard University, &c.

WE, the undersigned citizens of the town of Persia, Cattaraugus County, N. Y., and the town of Collins, Erie County, N. Y., most cheerfully certify that we and our families have used the Graefenberg Family Medicines, and especially the Graefenberg Vegetable Pills, with the most gratifying results. We believe they justly merit the good qualities claimed for them by the Graefenberg Company, and would confidently recommend them to the public.

Signed by Geo. S. Hicker; Thomas J. Parker, physician; Abraham Sucker, farmer; I. P. Rollen, farmer; John Havens, merchant; Ely Page, farmer; Stephen Hooker, farmer; E. J. Goss, drover; G. F. Southwick, farmer; P. Walden, farmer; Wm. Griffiths, butcher; D. Grannis, wheelwright; Edwin P. Daily, builder; H. N. Hooker, merchant, John Barnheart, farmer; E. Van Dorke, cordwainer.

Sworn to before John B. Wilbor, Justice of Peace.

CERTIFICATE FROM THE GOVERNOR OF VIRGINIA.

I, William Smith, Governor of Virginia, certify and make known that Joseph Prentice—who signs a certificate relating to the Graefenberg Vegetable Pills—is the Clerk of the Court of this State. The said certificate embraces the names of the most reliable and responsible people in this community, and certifies to the invariable curative action of the Graefenberg Vegetable Pills, in the following diseases:—

Bilious Complaints, Asthma, Constipation, Dyspepsia, Erysipelas; Low, Nervous and Simple Fevers; Gastric Fevers, Gripes, Heartburn, Headache, Indigestion, Hysterics, Liver Complaint, Nervous Disorders, Neuralgia, Rheumatism, and all diseases arising from want of action in the digestive organs.

And I further testify that full credit and faith are due and ought to be given to said certificates.

In testimony whereof, I have subscribed my name, and caused the Great Seal of the State to be affixed hereunto.

Done at the city of Richmond, the twenty-second day of November, in the year of our Lord one thousand eight hundred and forty-eight, and of the Commonwealth the seventy-third.

WILLIAM SMITH, Governor.

By the Governor, Wm. H. Richardson, Sec. Com. and Keeper of the Seal.

☞ Four boxes of Graefenberg Pills will be sent to any part of the country, without expense, on the receipt of one dollar.

☞ On the receipt of $5, or upward, that amount of Graefenberg Medicine, at retail prices, will be sent to any place in the United States where there is an express line from New York, or from the General Agency, free of charge.

☞ Any of the Graefenberg Medicines, or information regarding the Institute, its terms, &c., may be had by addressing
JOSHUA F. BRIDGE, M.D.,
Resident Physician Graefenberg Institute,
7eowtf No. 2 Bond Street, New York.

IRON PLANERS, ENGINE LATHES, AND OTHER MAchinists Tools, of superior quality, on hand and finishing, and for sale low; also, Harrison's Grain Mills. For descriptive circular, address NEW HAVEN MANUFACTURING CO., New Haven, Conn.
1 26

Zur Beachtung für deutsche Erfinder.

Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu adressiren an

Munn & Co.,
37 Park Row, New-York.

Auf der Office wird deutsch gesprochen.

Daselbst ist zu haben:

Die Patent-Gesetze der Vereinigten Staaten,

nebst den Regeln und der Geschäftsordnung der Patent-Office und Anleitungen für den Erfinder, um sich Patente zu sichern, in den Ver. St. sowohl als in Europa. Ferner Auszüge aus den Patent-Gesetzen fremder Länder und darauf bezügliche Rathschläge, ebenfalls nützliche Winke für Erfinder und solche, welche patentiren wollen.

Preis 20 Cts., per Post 25 Cts.

© 1861 SCIENTIFIC AMERICAN, INC.

The "Merrimac" as a Rebel Battering Ram.

The accompanying engraving of the *Merrimac* is from a sketch furnished by a mechanic who came from Norfolk under a flag of truce. He says that he worked on her and is of course familiar with her appearance.

The *Merrimac* was partially burned and then sunk at the time of the destruction of the Gosport Navy Yard last spring, by the order of our government, to prevent the stores therein from falling into the hands of the secessionists. She was one of the finest steam frigates in our navy, 3,200 tuns burthen and carrying 40 large guns. She was built at Charlestown, Mass., in 1855.

We have had accounts from time to time that the secessionists had succeeded in raising the *Merrimac*, and were repairing her. The mechanic who furnishes the sketch says that her hull has been cut down to within three feet of her light-water mark, and a bomb-proof house built on her gun deck, and that she is not iron plated as yet. Her bow and stern have been steel clad with a projecting angle of iron for the purpose of piercing a vessel. Her armament consists of four 11-inch navy guns on each side, with one 100-pounder Armstrong at the bow and stern. She has no masts, and only a pilot-house and smoke-stack are to be seen above the bomb-proof deck. Her bomb-proof is three inches thick and made of wrought iron. If the secessionists get her within reach of either of Rodman's big guns, the 15-inch or the 12-inch rifled cannon, it will afford a fine opportunity to try the effect of that ordnance on the 3-inch plates of her bomb-proof.

Manufacture of Sewed Shoes in Massachusetts.

In the *Shoe and Leather Reporter* it is stated that one year ago "no men's sewed boots were produced in the state (Mass.) except by custom workmen and half-a-dozen manufacturers in Quincy and its vicinity, who made sewed calf boots for the southern trade." A great change, however, has taken place within a few months among the Massachusetts shoemakers, especially since the great army contract for making 800,000 army bootees was given out on the 29th of July last. Pegged work at once received a notice to stand aside, and this has diverted the trade from former centers of shoemaking. Our cotemporary says:—

The traveler who passes through the towns of Quincy, the Weymouths, Braintrees, Abingtons and Bridgewaters, will miss the noisy industry which might have greeted his ears in former times. The sharp click of the sewing machine, and the quick tap of the hammer are no longer heard; but every little shoe shop by the wayside is alive with the cheerful voices of the journeymen, as with nimble fingers they pierce the sole or draw the thread; and every cross road leading to the large manufactories is dotted with people seeking fresh work or returning with the products of their labor. A single party in Boston employs about twenty manufacturers, one of whom gets out 4,000 pairs of shoes weekly. The work is usually cut in one shop, given out to be made, and when returned is packed, if shoes, in 50 pair cases, or boots in 24 pair and 50 pair cases, and sent to the Assistant Quartermaster's department in the city of New York, where they must be delivered at the expense of the contractor. Payments to the workmen are made weekly in cash, but the contractors have to await the convenience of the government, sometimes much to their inconvenience. The largest contracts awarded in Boston were 200,000 pairs each to Messrs. Ware & Taylor, and Zenas Sears, and 50,000 pairs to Jenkins Lane & Sons. At the large manufactory of the last named firm in East Abington, about 1,000 pairs of army shoes and 200 pairs of cavalry boots are made daily, giving constant employment to 700 hands, as in addition to their 50,000-pair contract they are filling several other large orders. The new manufactory of this firm, erected less than two years ago, contains every convenience which long experience can suggest or capital furnish, for the successful prosecution of the business.

The first sewed work produced in the Bay State was decidedly poor, but Yankee ingenuity adapted itself so readily to this branch, that it now stands pre-eminent.

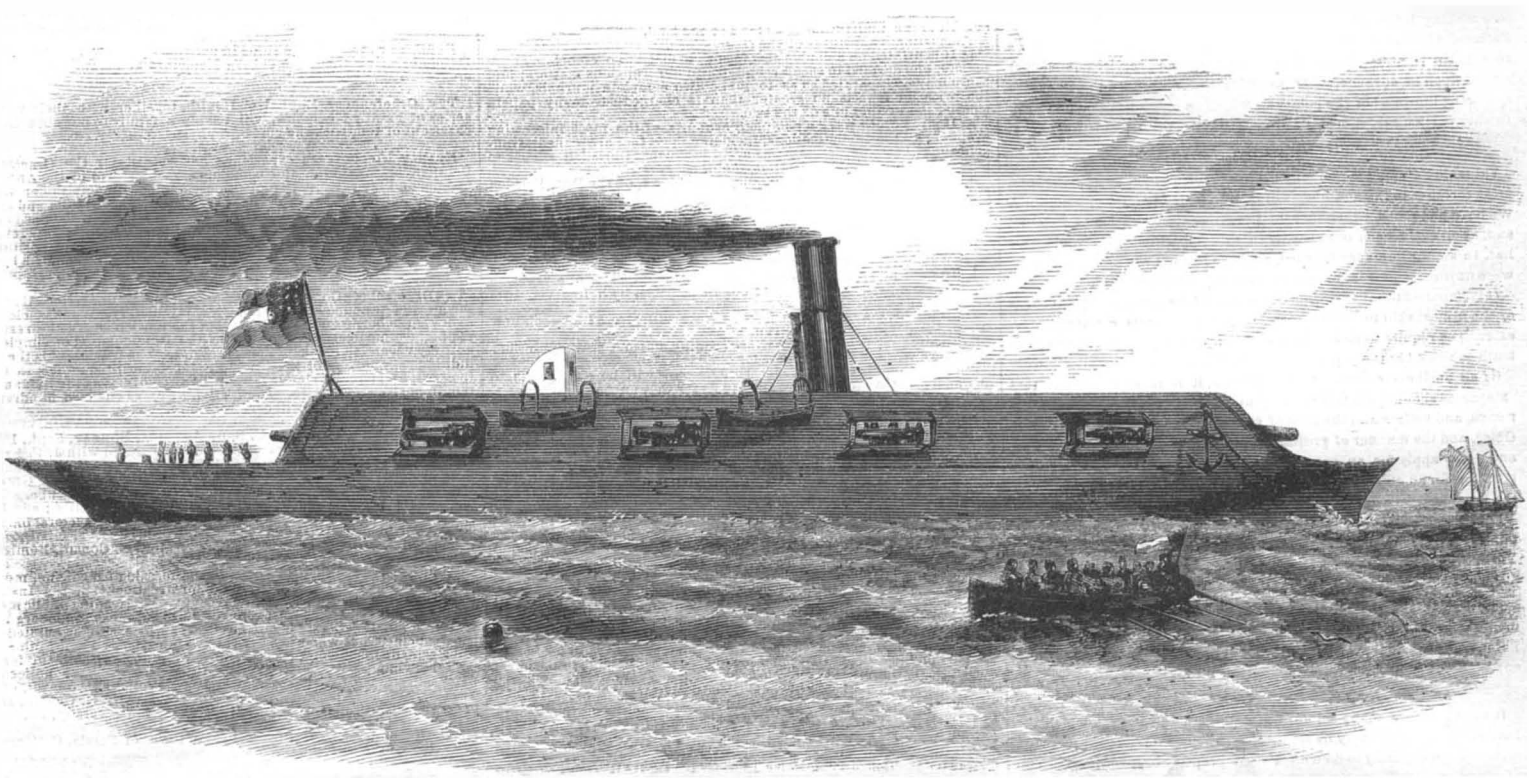
At the Quartermaster's office in New York city, the army goods are submitted to the judgment of Mr. Edson Bradley, a gentleman whose long experience in the shoe trade renders him peculiarly fitted for the office of inspector. As the contractors now understand thoroughly what is required, the quantity of shoes falling below the standard is comparatively small. Recent orders have been received from Washington to stamp all goods rejected "C," which stands for "condemned."

Light in the Sea.

A paper on the nature of the Deep Sea Bed, by Dr. Wallich, was lately read at a meeting of the Royal Institution of Great Britain. The following passage occurred in it:—"Light, or rather the absence of it, can hardly be said to determine, in any important degree, the distribution and limitation of the lower forms of animal life. Light is not essential even in the case of some of the higher orders. A large class of creatures, both terrestrial and marine, possess no true organs of vision, although there is good reason for believing that they do possess some special sensory apparatus susceptible to the influence of light; whilst certain creatures, whose habitation is in subterranean caves or lakes, as in the Magdalena near Adelsburg, and the Great Mammoth caves in Kentucky, either possess no organs of vision or possess them in so rudimentary a state, as to prove clearly that the absence or imperfect development of the sense may be compensated for by the higher development of other senses. It is impossible at present to say to what depth light penetrates in the sea. The photographic art will, no doubt, one day solve the problem. But it is almost certain that a limit is attained, and that, moreover, long before the deep recesses gaged by the sounding machines are reached, where the light-giving portion of the ray cannot penetrate even in its most attenuated condition; and yet, as shall hereafter be shown, creatures have been found down in those profound and dark abysses whose coloring is as delicate and varied as if they had passed their existence under the bright influence of a summer sun."

M. Saint Eclure, a French chemist, has noticed that when an iron rod is immersd in nitric acid of ordinary strength, the acid boils about the surface of the iron, and this action is continuous; but if steel be used instead of iron, this action of the acid only lasts for a few seconds, and then finally ceases. After the action of the acid has ceased the steel is said to be in a "passive" condition, and its capability of becoming thus "passive" completely discriminates it from iron. The cause of nitric acid acting upon steel only to a very limited depth is the accumulation of carbon on the surface as the iron of the steel is taken up by the acid.

A pair of blood hounds was recently sold in England for $750.



THE WAR STEAMER "MERRIMAC" RAISED AND CONVERTED INTO A BATTERING RAM.

PROSPECTUS

OF THE

SCIENTIFIC AMERICAN.

THE BEST MECHANICAL PAPER IN THE WORLD

SEVENTEENTH YEAR.

VOLUME V.—NEW SERIES.

A new volume of this widely circulated paper commenced on the 6th of July. Every number contains sixteen pages of useful information, and from five to ten original engravings of new inventions and discoveries, all of which are prepared expressly for its columns.

The SCIENTIFIC AMERICAN is devoted to the interests of Popular Science, the Mechanic Arts, Manufactures, Inventions, Agriculture Commerce and the Industrial Pursuits generally, and is valuable and instructive not only in the Workshop and Manufactory, but also in the Household, the Library and the Reading Room.

TERMS.

To mail subscribers:—Two Dollars a Year, or One Dollar for six months. One Dollar pays for one complete volume of 416 pages; two volumes comprise one year. The volumes commence on the first of January and July

CLUB RATES.

Five Copies, for Six Months..... $4
Ten Copies, for Six Months..... $8
Ten Copies, for Twelve Months..... $15
Fifteen Copies, for Twelve Months..... $22
Twenty Copies, for Twelve Months..... $28

For all clubs of Twenty and over, the yearly subscription is only $1.40 Names can be sent in at different times and from different Post-offices Specimen copies will be sent gratis to any part of the country.

Western and Canadian money or Post-office stamps taken at par for subscriptions. Canadian subscribers will please to remit 25 cents extra on each year's subscription to pre-pay postage.

MUNN & CO., Publishers,
No. 37 Park-row, New York.

FROM THE STEAM PRESS OF JOHN A. GRAY.

© 1861 SCIENTIFIC AMERICAN, INC.